NETWORK WORLD
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FCC gets earful on caller ID

BY ELLEN MESSMER

Washington, D.C.

The Federal Communications Commission's new policy on caller ID services last week drew praise from users but outcries from carriers, state regulators and privacy advocates.

In March, the FCC preempted state authority to ban caller identification or automatic number identification services, and ordered local and long-distance carriers to link their networks by April 1995 so customers can get nationwide caller ID services.

Business users have voiced support for the FCC efforts to eliminate the patchwork of local regulation that complicates caller ID and ANI services.

But state regulators last week warned that the FCC has provoked a constitutional crisis by preempting

See Caller ID, *page 81*

Playing by the new rules

FCC caller ID and ANI requirements:

- Caller ID will be allowed nationwide.
- Carriers must offer free per-call blocking.
- Carriers using Signaling System 7 must send the calling party number parameter and associated privacy indicator on interstate calls at no cost.
- Carriers can offer ANI with 800, 900 and other services, but businesses may not resell or reuse ANI data about callers in most instances.
- Carriers must educate subscribers about caller ID and ANI.

PRODUCT REVIEW

Lotus Notes thrives in NLM form

BY STEVEN GOLDBERG

NetWare users reluctant to shoulder the burden of adding OS/2 to their operating system mix simply to support Lotus Development Corp.'s Notes might find a new NetWare Loadable Module (NLM) version of the groupware product more appealing.

Our examination of Lotus Notes Server for NetWare Version 3.1 uncovered an application rich in features that integrates easily into NetWare local nets and offers comparable performance to that of Notes for OS/2.

Sites that have already taken the Notes plunge with the OS/2 or Unix server version will also be pleased to find that coexisting with or migrating to this new release, which has been shipping for two months, is both uncomplicated and straightforward.

On the downside, Notes for NetWare does not support NetWare 4.X, and it lacks support for Notes companion products, which include the Notes facsimile server and optical character recognition (OCR) modules. In addition, Lotus Notes:Document Imaging (LN:DI) is unavailable for NetWare.

Continued on page 60

NET *Result*

Vendor:
Lotus

Product:
Lotus Notes Server for Novell NetWare Version 3.1

Key findings:
- Tight integration in NetWare 3.X environment
- Seamless coexistence with Notes server for OS/2
- Straightforward installation procedure
- Lacks companion product support

Server requirements:
- 80386 or higher
- NetWare 3.11 or 3.12
- 24M bytes of memory
- 300M bytes of disk space

100

Start-up to simplify internets with 'Relational Networking'

Agile's ATMizer takes over for local routers, high-end hubs.

BY SKIP MACASKILL

Concord, Mass.

Start-up Agile Networks, Inc. this summer will unveil an ATM backbone switch that promises to save users money and simplify network design by minimizing the need for routers and high-end hubs.

According to sources briefed on the product, Agile's ATMizer (pronounced "atomizer") combines Asynchronous Transfer Mode switching with routing and packet-to-cell conversion functions, and will provide advanced features — dubbed Relational Networking capabilities — for helping users establish so-called virtual local-area networks.

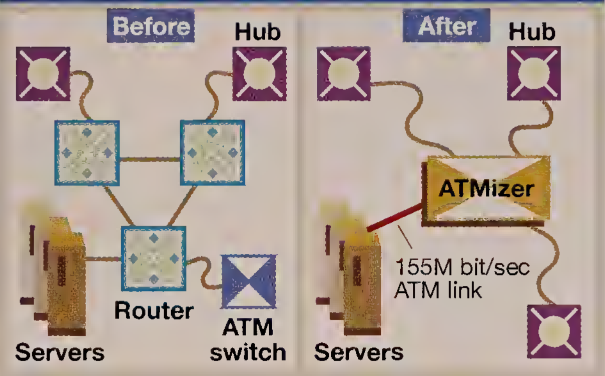
Ralph Ungermann to reemerge under the ATM banner. See story, page 79.

A virtual LAN logically groups end users on different physical network segments to support collaborative work efforts and ease net management.

Sources said ATMizer will feature an integrated ATM switch that will serve as a backbone for campus networks. The device, which will be available in several configurations and port densities, will support multiple LAN segments, converting incoming

See ATMizer, *page 79*

Cleaning up internets



Agile's ATMizer switch will combine routing and ATM switching in a single box, reducing the complexity of LAN internets. It will also let users create virtual LANs and offer high throughput with low latency.

GRAPHIC BY SUSAN SLATER

Novell maps out object plan

BY CARYN GILLOOLY
AND CHRISTINE BURNS

Provo, Utah

Novell, Inc. next month is expected to map out a new object strategy that will center around a homebrewed framework for developing and implementing distributed object-oriented applications across enterprise nets.

Until just a few months ago, HyperDesk Corp. object technology — particularly its HD-DOMS product — was central to Novell's object strategy. But when signs indicated HyperDesk would exit the object request broker (ORB) market — which it ultimately did — Novell began shopping for alternatives (*NW,* March 14, page 6).

Now Novell is planning to offer its own ORB technology, tied to NetWare and AppWare. Additionally, the company will support other vendors' ORBs, ultimately broadening the number of object-oriented applications users will have to choose from.

An ORB is software that lets objects and applications talk to one another across a network. For example, when a client makes a request for information, the ORB sets up the communication between the client and one or more objects to furnish the requested data.

See Novell, *page 79*

Relational DBMS network education has only just begun

BY KEVIN FOGARTY
AND ADAM GAFFIN

RELATIONAL 25th year DBMS

They are a central component in today's client/server networks. But 25 years after being described in a pioneering series of papers, relational databases still have a long way to go to support true distributed applications.

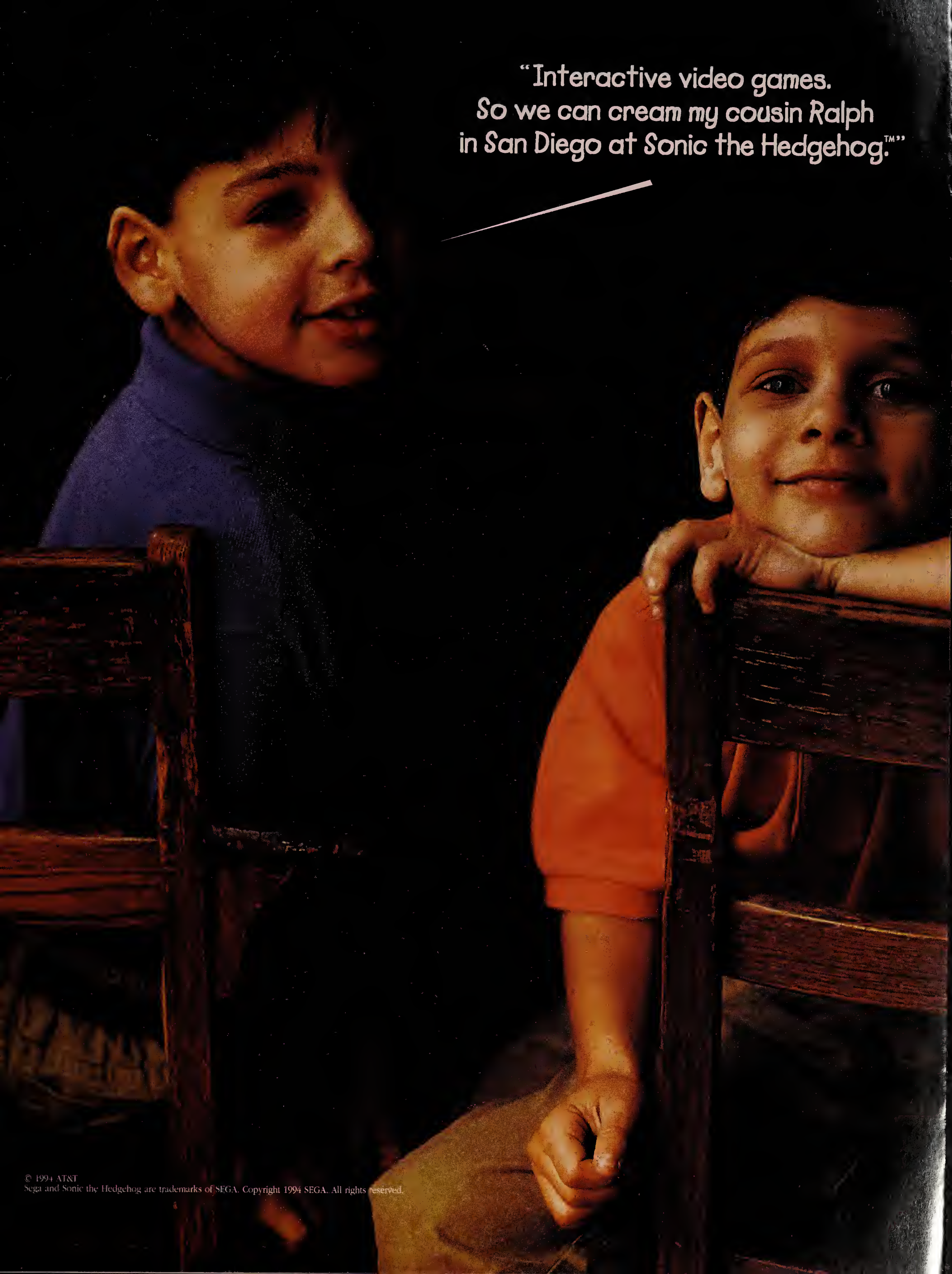
Industry observers predict that relational databases will continue to power client/server applications well into the next century. But while their performance has greatly improved since the first products went up against older hierarchical databases such as IBM's IMS, relational products must adapt to meet changing user needs.

For one thing, users have to wait awhile before the promise of true distributed databases is fulfilled. Database replication and synchronization technologies are only now getting off the ground, and companies still cannot easily run databases or applications across multiple processors — either within

See DBMS, *page 43*

How to make databases more network-capable

- Improve intra- and intercompany database security.
- Better integrate different vendors' databases.
- Allow them to handle complex data types, such as multimedia files.
- Provide transparent access to data.
- Enable distributed databases and replication capabilities to be managed centrally.
- Allow queries to be processed on several servers simultaneously.


"Interactive video games.
So we can cream my cousin Ralph
in San Diego at Sonic the Hedgehog.™"

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AT&T SERVICE NET-2000
MORE THAN JUST EQUIPMENT
WHAT YOU NEED TO COMPETE

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WHAT DOES THE NEXT GENERATION WANT FROM US, ANYHOW?

Briefs

More ammo against fraud. AT&T is promoting safe telephony. The carrier last week announced new pricing structures for its basic Net-Protect toll fraud monitoring service that includes an automatic across-the-board customer liability limit of $25,000 for those who use on-premises telephone systems. For customers who detect and report the fraud first, the liability limit will be cut in half to a maximum of $12,500 for any one incident. Customers can also purchase coverage that lowers their liability limit.

UTG makes it official. The UnixWare Technology Group (UTG) last week kicked off its legal incorporation and outlined the future of Novell, Inc.'s UnixWare product strategy. UTG will have a business plan by this summer that will include programs to prioritize features and functionality for how UnixWare — an integrated Unix/NetWare operating system — should be developed. Larry Lytle, a former Novell and Hewlett-Packard Co. executive named president and chief executive officer of UTG, said the group will explore different hardware platforms on which UnixWare can run, among other things.

'Hello, no one is here right now . . .' Now don't everyone throw your answering machines out at once. MCI Communications Corp. this week plans to announce MCI Network Voice Mail, a voice mail service to be available nationwide by late July. The service would allow businesses to quickly set up messaging for remote offices, the carrier said. Features include intracompany message forwarding and message reply. Pricing has yet to be determined.

Quickest way between two points. IBM this week will roll out its first Fiber Channel adapters that facilitate communication between high-powered workstations at speeds up to 1,000G bit/sec. The Fiber Channel technology, a specification set by IBM, Hewlett-Packard Co. and Sun Microsystems, Inc. last year, is a point-to-point transport between machines guaranteeing uninterrupted bandwidth for data-intensive file transfers. IBM will unveil the adapters along with revamped of RISC System/6000 workstations and servers that run on the PowerPC and PowerPC2 chips jointly developed by Apple Computer, Inc., IBM and Motorola, Inc. Pricing and availability for the adapters and RS/6000s were unavailable.

Hold that tiger. Hot to plant its flag in the nascent video server market, Microsoft Corp. last week unveiled Tiger, file server software with the potential to deliver simultaneous streams of video and audio to tens of thousands of users over broadband networks. Tiger software will operate over a distributed network of virtually any number of Intel Corp.-based servers running Windows NT Advanced Server, Microsoft officials said. The software is designed to make on-demand video — such as feature films over television — a commercial reality. Microsoft is touting Tiger as a cost-effective alternative to media servers based on high-end, massively parallel processing servers, namely Oracle Corp.'s Media Server.

Nextel in line. What isn't in the air over Los Angeles these days? Heretofore an analog specialized mobile radio service provider, Nextel Communications, Inc. last week said its first circuit-switched digital wireless net is up and running in Los Angeles. Nextel, which recently gained an infusion of $1.3 billion from MCI Communications Corp., has central and northern California next on its list for the digital network.

AT&T on a roll. AT&T won another Information Superhighway general contracting bid by a local telephone company last week when it was chosen by Bell Atlantic Corp. to build the broadband video and data infrastructure in that carrier's region. Earlier this month, AT&T assumed a similar role for Southern New England Telephone Co., and Pacific Telesis Group chose the company late last year as lead contractor for its $16 billion broadband net in California.

Contacts

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Table of Contents

NEWS

IBM beefs up the newest member of its FEP line with frame relay support. *Page 3.*

Brokerage firm hangs on to VSAT network during shift to client/server computing. *Page 3.*

Big Blue to make product splash at DB/EXPO '94 with new middleware. *Page 5.*

Sybase reveals its strategy for bringing multimedia applications to the enterprise. *Page 5.*

EDI products to speed message exchange. *Page 5.*

Merger could marry Sprint's telecommunications resources to EDS' computing expertise. *Page 5.*

Wall Data's new software provides central control for multivendor hosts. *Page 7.*

Rochester Telephone and the N.Y. Public Service Commission strike a preliminary agreement for telco-CATV competition. *Page 9.*

IBM's Networking Systems falls victim to the latest round of cutbacks. *Page 9.*

CA backs Ingres with ASK Group buyout. *Page 10.*

Concord raises its Trakker net analysis tool to a new level. *Page 13.*

ENTERPRISE INTERNETS

Digital has a systems manager for Hermes in the works to let users monitor Ultrix and OpenVMS workstations. *Page 14.*

NTI broadens its Magellan line of enterprise switches to the branch office. *Page 14.*

LAN WORLD

Token-ring hub sales plummet for third straight quarter as users turn to Ethernet. *Page L1.*

Organizations put up fire walls to protect the Internet from intruders. *Page L1.*

GLOBAL SERVICES

IBM to bridge wireless, wired net interoperability gaps with Intelligent Communications. *Page 28.*

AT&T jacks up its long-distance rates for the third time in nine months. *Page 28.*

CLIENT/SERVER APPLICATIONS

Q&A: Oracle moves into the fast Lane. *Page 40.*

Motorola unit is cutting back on paperwork and saving time with electronic forms. *Page 40.*

DEPARTMENTS

- **Opinions.** *Page 49.*
- **Letters.** *Page 63.*
- **Action Center.** *Page 65.*
- **Networking Marketplace.** *Page 72.*
- **Networking Careers.** *Page 76.*

PRO/CON

NetWare experts debate the long-term effects of Novell's union with WordPerfect. *Page 50.*

The Buyer's Guide reveals that the increase of client/server networks adds another layer of complexity to the already tricky process of selecting a relational DBMS. *Page 52.*

Network HELP desk

Network World tracks down answers to your questions regarding products, services, technologies or disputes with vendors. Please submit questions to Dana Thorat at (800) 622-1108, via fax at (508) 820-3467, via the Internet at djt@world.std.com or via CompuServe at 73244,2673.

Our office supports an AT&T StarServer E minicomputer running Unix System V Release 4 and WordPerfect Office 3.1. We also support several local-area networks using the Microsoft Windows for Workgroups 3.11-based E-mail and scheduling. These LANs can be connected with our campus Ethernet. So how do we get everybody talking?

Ray McCauley, Galveston, Texas

Daniel Blum, a principal with Rapport Communication in Takoma Park, Md., replies:

You should be able to configure your Windows workstations on the LAN to communicate with the StarServer with Transmission Control Protocol/Internet Protocol.

According to Microsoft Corp., you can use Microsoft's TCP/IP over Novell, Inc.'s NetWare, Microsoft's LAN Manager, The Wollongong Group, Inc.'s Win/TCP for DOS Runtime Version 4.1 and FTP Software, Inc.'s PC/TCP Kernel 2.05 or above. For more information about these products, call Microsoft at (800) 426-9400, The Wollongong Group at (415) 962-7100 and FTP Software at (508) 685-4000.

Once you get your Windows workstations talking to the StarServer, you will find that using the Simple Mail Transfer Protocol (SMTP) gateway products from WordPerfect Corp. and Microsoft is the least expensive way to communicate directly between Microsoft Mail and WordPerfect Office. You will also probably be able to transfer binary as well as text files over the interface, as both vendors claim their gateways now support "uuencoding" of binary data.

For more information on the SMTP gateway products, call WordPerfect at (800) 321-5906 or Microsoft at (800) 426-9400.

I am looking for an inexpensive product that will allow a group of people on a network to build and edit a document jointly.

I heard something about a product called CA-

See Help desk, *page 64*

DB/EXPO PREVIEW

IBM DB2 announcements lead product parade at conference

BY KEVIN FOGARTY

San Francisco

IBM next week will introduce new middleware and a decision support application, as well as enhancements to DB2, which are designed to let different versions of the database work better together.

IBM will use the DB/EXPO '94 conference here as a platform to launch or demonstrate the new products and enhancements. Informix Software, Inc. and Sybase, Inc. (see story, this page) will be among the other vendors making announcements at the show.

Big Blue's product splash will feature middleware called DataJoiner, which will let the previously isolated DB2 products access data from other vendors' SQL databases. The software will run on a server and translate data between all DB2 versions and almost any other database, said Hershel Harris, IBM's manager of business development for database products.

The product will work with an SQL optimizer called Starburst that IBM will include in Version 2.0 releases of DB2/2 and DB2/6000 later this year. SQL optimizers eliminate redundancies in SQL queries and tune them to run more efficiently.

DataJoiner will also support Microsoft Corp.'s Open Database Connectivity specification. IBM has not set a price for the software, which enters beta testing later this year.

IBM will also unveil Visualizer, a decision support application for corporate executives that will give them access to DB2 data via a graphical user interface. The product will let even nontechnical executives construct SQL-based ad hoc queries of corporate databases without having to program in SQL. The software is designed to convert data into graphs and reports.

The product is modular, with the query application due out shortly after DB/EXPO and analysis and presentation modules to be added later. It will run initially on OS/2 and AIX desktops, and will query only various versions of DB2. IBM plans to port it to Windows and allow it to query non-IBM databases within the year. Prices have not been set.

IBM will also demonstrate Version 1.2 of its client/server DB2 products, which run on DB2/2 for OS/2 systems and DB2/6000 for RISC System/6000 systems running AIX. The new version will include support for better interoperability between DB2 running on desktops, servers and mainframes. Version 2.0 of the databases, due out later this year, will make the different versions of DB2 even more compatible.

"We're bringing [the DB2 versions] closer together," Harris said, adding that critics have exaggerated the degrees of separation between the SQL dialects used by DB2 on an MVS mainframe and the client/server versions.

Observers have also claimed that the software lacks the features and power needed to compete with Unix-based relational database management system products from other vendors. IBM is addressing those complaints, as well, with plans to, among other things, add support for object data in new releases of the database software.

"The mistake some vendors made was to forget that IBM has the largest research and development lab in the world, and that if you hit them upside the head with a baseball bat, they're going to come out really pissed," said Richard Yevich a principal of consultancy RYC, Inc. in Cherry Hill, N.J.

Other announcements at the show will include:

■ Informix will spell out its data warehousing strategy. The firm has formed agreements to incorporate its parallel processing-enabled Informix OnLine Dynamic Server with data extraction and transformation software from Prism Software, Inc., Carleton Corp. and Evolutionary Technology, Inc. It calls for Prism, Carleton and Evolutionary Technology products to extract data from legacy databases and convert it to a form that Informix databases can handle.

■ Independence Technologies, Inc. (ITI) will demonstrate its iTran middleware, which will integrate on-line transaction processing applications with personal digital assistants like Apple Computer, Inc.'s Newton. The software supports Top End, Tuxedo and Encina transaction processing monitors. Pricing has not been set.

©IBM: (800) 426-2255; Informix: (800) 331-1763; ITI: (510) 438-2000.

Interactive EDI software to speed message exchange

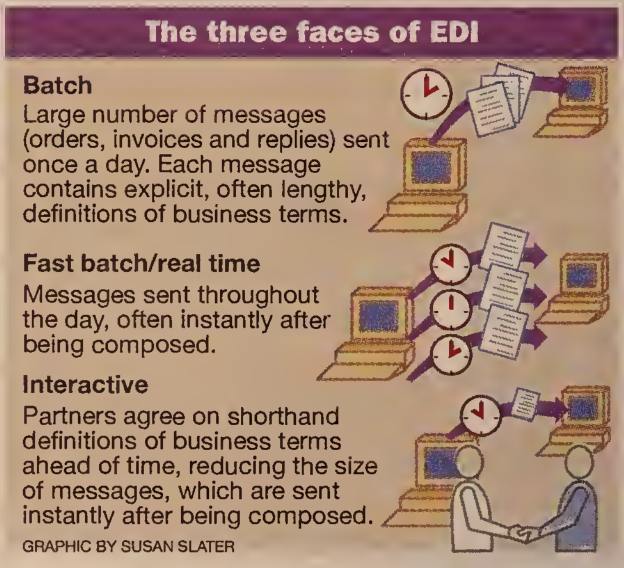
BY ADAM GAFFIN

Electronic data interchange is slimming down.

New software from a variety of vendors and interconnections between many value-added networks (VAN) allow for real-time exchanges of EDI messages. But users, vendors and standards bodies are now working to reduce the average size of EDI messages to further speed their processing.

The goal is near-instantaneous access to the information the messages contain. For example, a hospital could use interactive EDI to see whether an emergency room patient has insurance, according to Don Petry, director of health care and insurance for ASEC Systems, an EDI consultancy in Windham, N.Y.

Such steps mean EDI "is going to be the most fundamental change in the business community since the stock market," predicted Harry Steck, president of Electronic Commerce Solutions, an EDI consultancy in Woodbridge, Va.



The three faces of EDI

Batch
Large number of messages (orders, invoices and replies) sent once a day. Each message contains explicit, often lengthy, definitions of business terms.

Fast batch/real time
Messages sent throughout the day, often instantly after being composed.

Interactive
Partners agree on shorthand definitions of business terms ahead of time, reducing the size of messages, which are sent instantly after being composed.

GRAPHIC BY SUSAN SLATER

EDI started as a batch process, in which trading partners typically exchanged all of their messages once a day. In recent years, multiple daily exchanges have become common as companies demand even faster turnarounds on such things as purchasing and shipping.

But because EDI transaction translation and processing is resource-intensive, reducing the size of individual EDI messages is needed to handle vast volumes of messages, such as those that might be generated

See **EDI**, *page 80*

Sybase dives into multimedia market

BY ADAM GAFFIN

San Francisco

Sybase, Inc. this week will formally announce its strategy for bringing multimedia applications to the enterprise.

At DB/EXPO '94 here, the company will unveil a suite of tools, collectively known as Extended Enterprise, for giving end users quick access to graphics, images and other complex data types stored in a variety of information sources across a net.

While the company will emphasize the business uses of multimedia, it will also announce plans to get into the interactive television market targeted by rival Oracle Corp. The company plans to develop software that will let home viewers select movies through their televisions.

"I would suspect that a product that tries to do all those things probably won't do any of them particularly well."

A Sybase spokeswoman declined to comment last week. But other sources said that under the Extended Enterprise strategy, existing Sybase databases will be used essentially as traffic cops, storing information about the location of multimedia data in a net and retrieving it for users.

The plan would provide integration between Sybase's existing databases, which are tuned for storing traditional transactional data, and object-oriented databases, which are particularly good at storing graphics, images and documents, said David Yockelson, senior research analyst at the META Group, Inc., a Westport, Conn., consulting firm.

He said one example of an Extended Enterprise application would be for a financial company to link stock tickers, news wires and corporate data into a seamless data source that traders could tap via cellular phones or modems. When a broker makes a request for all recent data on a specific company, a Sybase database would find the information and route it to him.

"But can you find that stuff quickly enough?" Yockelson asked. "It's kind of suspect that relational [databases] can handle that work."

Key to Extended Enterprise is Sybase's Gain Momentum development tool kit, which will be used to build multimedia applications that work across diverse data sources and clients. The tool kit is based on an object-oriented database from Objectivity, Inc. of Mountain View, Calif.

Yockelson said he would not be surprised if Sybase announced partnerships with network companies to deal with data transport issues.

Nick Arnett, president of Multimedia Computing Corp., a Campbell, Calif., consulting firm, praised this tool kit approach, saying it would provide more flexibility than Oracle's approach. Oracle will seek to provide all the components of the architecture — from object stores to billing systems — itself. "I would expect that a product that tries to do all those things probably won't do any of them particularly well," he said.

Arnett said the corporate multimedia market would take off slowly. "Businesses in general don't quite know what they want yet."

A major hurdle for vendors is developing more powerful search tools that let end users both access information quickly and browse through data storehouses. "Nobody has figured out yet how you're going to find anything," he said, adding that Sybase "has probably made more progress than anybody else."

EDS/Sprint merger could give users one-stop shopping

BY BILL BURCH

Washington, D.C.

EDS Corp. and Sprint Corp. last week revealed that they are discussing a merger, a move that would marry Sprint's telecommunications resources to EDS' computing expertise, giving users a single source for net services.

Negotiations are in the early stages, according to Sprint Chairman William Esrey, who told analysts that there are a number of hurdles to be cleared before the alliance is certain. The deal could take as long as a full year to close, the companies said.

First among the challenges will be EDS' departure from General Motors Corp. The automobile manufacturer has owned EDS since 1984 and is the source of more than one-third of its revenue.

Given the revenue picture, EDS will need to sign GM up for a new, long-term outsourcing contract soon after the spin-off, predicted analysts at The Yankee Group, a Boston consultancy.

Beyond the spin-off, EDS and Sprint must come to terms on an actual merger agreement and decide which one will lead the combined companies.

If the merger does goes through, the two companies would be a formidable high-tech combine with annual revenue of more than $20 billion and a total of 120,000 employees.

"A merger would . . . allow EDS the opportunity to expand our relationship

See **EDS/Sprint**, *page 81*

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NetWare-to-host access key to new Wall Data pack

BY JIM DUFFY

Redmond, Wash.

Wall Data, Inc. last week unveiled software that gives Novell, Inc. NetWare users simultaneous access to multivendor hosts.

The software, called Rumba Office for NetWare Systems, provides users with a single graphical interface from which they can access IBM mainframes and Application System/400s, Digital Equipment Corp. VAX processors and Unix servers. It's intended to make data retrieval from multivendor systems quick and easy.

Rumba Office for NetWare Systems runs on a personal computer under DOS or Windows, and works with NetWare 2.11 or higher. It features a number of key capabilities, including Local Area Transport (LAT) connectivity to VAX hosts.

This feature provides users with an interface to Novell's NetWare for LAT product, which serves as a common data pipe from a NetWare network to a VAX or other LAT host. That eliminates the need for additional protocol stacks, terminal servers and bridges.

Rumba Office for NetWare Systems also has a batch file transfer feature whereby users can set up a list of files they want transferred. A drag-and-drop feature lets users take a file icon from a Windows file manager and drop it into a Rumba session to initiate a transfer.

Another feature, selective install, lets users load only those host sessions and interfaces they need, saving disk space on the user's PC.

The product also includes a feature called NetWare Systems Workspace Manager. Systems Manager allows users to group Rumba profiles and other Windows icons into workspaces in which all icons are activated with a single mouse click.

Rumba Office for NetWare Systems also features a floating tool bar for placing the most frequently used commands at the top of the session screen, and a developer's tool kit for linking desktop and host applications.

Analysts said Wall Data and Attachmate, Inc. are leading the pack with graphical host access tools. "They're the ones leading the charge these days, and they are extremely competitive," said Michael Heylin, senior associate at Creative Strategies International in San Francisco.

"It's somewhat a matter of taste as to which interface is preferred," he said.

Wall Data is bundling Novell's LAN Workplace for DOS TCP/IP stack with the new product at no additional charge, giving users the option of running Transmission Control Protocol/Internet Protocol on their NetWare LANs in addition to Novell's Internetwork Packet Exchange (IPX).

Some users saw promise in the product.

"We run completely NetWare right now," said John Beik, PC network technician at CIBA-Geigy Corp. in Summit, N.J. "I do have at least two or three users in my department who are going to need something like [the LAT capability]."

A single-user license fee for Rumba Office for NetWare Systems costs $400. It is available now.

©Wall Data: (800) 487-8622.

CyberSpeak: *Voices from the reader network*

A law firm recently distributed thousands of ads in Usenet conferences. What do you think about firms using the Internet for commercial gain?

We got a taste of what it was like to be that law firm last week, as we were inundated with responses — mainly via the Internet — to this question. Here's a sampling, in this expanded version of CyberSpeak.

◆ "We have ambulance chasers everywhere, so it is inevitable that we should get them on the electronic media. Law firms are very highly computerized for tracking of case loads, assembling case information and filing of briefs. It is only logical that they would distribute electronic ads. Without these ads, we might not be aware of services that are available to us and the rights that we might have. However, they can be like junk mail. Let's hope our rights don't get violated, that we might need legal recourse. We then might be reminded of the discussion between St. Peter and the Devil on settling a dispute. St. Peter said: 'I'll sue you.' The Devil replied: 'Where are you going to get an attorney?'"

Jerry Oswald, information support officer, U.S. Army, DPCA Services Division, Fort Harrison, Ind.

◆ "Like it or not, there are those out there who are going to do whatever they can to make a buck. I've got a solution so simple I'm amazed that I never thought of it before. Don't waste time complaining to their provider. Instead, send a reply directly to them asking for more information. Call their 800 number, fax them E-mail them. When these brilliant marketing wizards get thousands of replies, they will be overwhelmed. They won't be able to accurately determine who, if anyone, really is interested in the crap they are pushing. Let's turn the lure of thousands of readers against them."

Dan Nadir, Solsource Computers, Carlsbad, Calif.

◆ "It is unrealistic to believe that the Internet will not be used by companies or individuals as an advertising tool. The fact that you can reach 20 million people for minimal costs makes the 'Net attractive to advertisers who are constantly looking for new ways to hawk products to consumers. The answer lies in 'moderated' Usenet boards where the moderator can determine which messages are or are not posted on their boards."

Stephen Goodman, national accounts support consultant, MCI Communications Corp., Glen Allen, Va.

◆ "They should be as welcome to use the Internet for commercial gain as we are to respond. Advertisers will probably find they prefer less interactive media."

Daniel Sternbergh, technical staff, Desktop Products Division, Oracle Corp., Redwood Shores, Calif.

◆ "I have no problem with commercial services being offered through appropriate forums, but spamming should continue to be prohibited, just as chain letters and the like are prohibited. Access to the Internet should be denied to anyone who has refused to obey the rules. Perhaps some pre-edit of messages to conferences will be necessary (similar to that provided on many list servers now) to cull out the junk mail before it is broadcast to all members of a group."

Carl Singler, Jr., CPA, director of internal audit, SUNY—Stony Brook, Stony Brook, N.Y.

◆ "No matter which position you take toward the commercialization of the Internet, it will happen. The real question is will companies be smart enough to wise up and adopt the culture and mores of the net, or will they proceed like a bull in a china shop and continue to use traditional methods of marketing and advertising in a virtual community? We cannot allow unsolicited junk mailing and littering of Usenet sites. This will destroy the best qualities of the net. But, marketing with some of the less aggressive approaches such as Gopher and [WorldWide Web] may offer new services to the net. This has the ability to raise the quality of life in cyberspace for all inhabitants."

Brock Poling, president, MC2 Cyberspace Research, Inc., Columbus, Ohio

◆ "It is obvious that many firms use the Internet for commercial gain. If they follow the rules and do not disrupt the operation of the network, there is little problem. But if they clog the network by broadcasting unsolicited and inappropriate messages to unrelated Usenet conferences and Listservers, the entire Internet could be compromised. It appears that Canter & Siegel, the law firm which recently flooded both Usenet and LISTSERVs with their Green Card Lottery posting, has secured for itself a place in the folklore of the Internet. Canter & Siegel may have not caused as much damage and disruption as Robert Morris, but its activities demonstrate a wanton disregard for the network community."

Arthur Mendonca, technical services expediter, Educational Technology Department, Providence Public Schools, Providence, R.I.

◆ "Where there is Internet, there will be business. Where there is business, there will be customers. Where there are customers, there will be advertising. Stopping it would be like stopping junk mail."

Antonio Tate, network administrator, University of Mississippi Medical Center, School of Nursing

◆ "I was appalled when I saw the infamous Green Card ad appear in every single newsgroup on Usenet. It wasn't so much the advertisement that was the problem; it was the casual disregard for the Usenet community standards that have evolved over time."

Phil Scarr, computer systems engineer NTC, Department of Neurosurgery, University of Virginia

◆ "The way that the law firm distributed its solicitation was very obtrusive due to the indiscriminate way that the firm decided to send it out.

"I am proud to say that I was one of the many people who sent flames back to the firm and who helped to cause their electronic mail address to be shut down by the service provider."

Michael Lausin, Novell and Unix systems administrator, McDATA Corp., Broomfield, Colo.

◆ "In New Jersey, there are still a few intersections controlled by traffic circles — known as roundabouts in other parts of the world. Traffic circles can actually work better than those intersections controlled by lights and signs.

"There are no rules to driving through a traffic circle, but if all of the drivers in the intersection approach it with an understanding of how it works and a spirit of cooperation, cars approaching from any direction can pass through without stopping.

"Usenet is the biggest traffic circle in the world. Unfortunately, the spirit of cooperation that built Usenet in the first place has all but gone. So don't be surprised if red lights start to appear; and definitely be prepared to take alternate routes."

Tony Shepps, assistant MIS manager, Clemens Markets, Inc., Kulpsville, Pa.

◆ "If I'm having a private conversation with my friends, the last thing I want is to have someone interrupt and try to sell me insurance (or law services or the local newspaper).

"My interaction on the Internet falls in the same category as a conversation with some friends.

"Don't interrupt to try to sell me something unless I asked you about it first."

Robert Bradspies, chief executive officer, Decision Systems, Inc., Los Angeles

NextWeek CyberSpeak Out!

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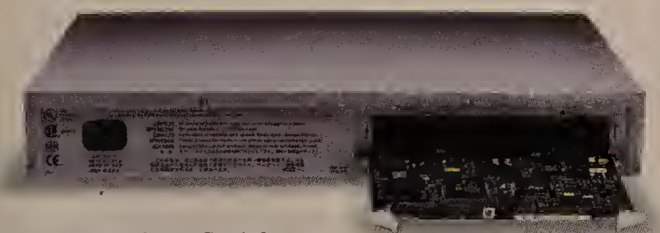

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N.Y. launches plan for first real telco-CATV competition

BY JOANIE WEXLER

Rochester, N.Y.

Rochester Telephone Corp. and the New York Public Service Commission last week made potentially precedent-setting strides toward unshackling the local loop when they struck a preliminary agreement to crack competition wide open in upstate New York.

Rochester Telephone, the commission and cable television operator Time-Warner, Inc., which is anxious to offer local telephone services, came up with a plan for balancing access privileges to Rochester Telephone's net with the regulatory relief the telephone company seeks.

The measure, if approved, would mean lower prices and more choices for customers and could serve as a model for other telephone companies trying to craft similar plans, analysts said.

"This will hopefully create a domino effect at the state level," said Robert Rosenberg, president of consultancy Insight Research Corp. in Livingston, N.J. "It opens the network in a way that the stockholders don't lose value but the ratepayers get new value."

Elaine Altman, a telecommunications analyst at Furman, Selz, Inc. in New York, said the plan could "give Congress incentive to move faster [on allowing local telcos to provide cable services in their regions] because Congress doesn't like to be preempted by the states."

Many telephone companies, most notably Ameritech (*NW,* April 18, page 8), have been actively bargaining to open their networks to competitors in return for freedom from regulatory restraints such as the Communications Act of 1984, which bars telephone companies from providing CATV offerings in their service areas.

Providing that the proper safeguards are built in, the upshot for customers will be increased choices both in the local loop and in

See **Competition,** *page 81*

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Circle Reader Service #12

IBM network group to face round of cuts

BY MICHAEL COONEY

Raleigh, N.C.

It looks like the halo over IBM's Networking Systems unit is dimming.

After avoiding most of the cutbacks suffered by other business units during the past couple of years, IBM last week announced that by the end of 1994, Networking Systems and its sister unit Software Solutions will face a work force reduction of 7%, or about 750 people.

IBM Networking Systems profile

Headquarters:	Somers, N.Y.
Employees:	Approximately 7,000
Revenue:	$5.8 billion (estimated 1993)
Major products:	3745, 3172, 3174 controllers, 6611 router, VTAM, NCP, NetView, AnyNet and LAN products
Development locations:	Raleigh, N.C.; Hursley, England; Rome; and La Gaude, France
Management:	Ellen Hancock, senior vice president; Don Haile, general manager networking software division; and B.J. Johnson, general manager, networking hardware division

Software Solutions is responsible for high-end software products such as DB2, while Networking Systems develops everything from adapter cards to front-end processors.

An IBM spokesman said the cuts, which involve layoffs and early retirement buyouts, are part of the company's continuing drive to return to long-term profitability. He said no particular technological area would be singled out; the reductions will be spread evenly over all aspects of the units.

Last July, IBM said it expected to reduce its work force by an additional 35,000 employees in the next 12 to 16 months through a combination of layoffs, attrition and early retirement. The plan was to have a work force of about 225,000 people by the end of this year, down from a high of 405,000 in 1985.

At that time, IBM declined to specify which business units would be most severely affected but said the majority of the cutbacks would fall

See **Reductions,** *page 81*

CA adds ASK Group to its acquisition collection

BY KEVIN FOGARTY

Islandia, N.Y.

Computer Associates International, Inc. (CA) last week announced plans to purchase The ASK Group, Inc., the financially struggling sellers of the Open Ingres database, for about $309 million.

The purchase may make the future brighter for Ingres users. Before CA's announcement, observers were pessimistic about the database's future, which got top marks for technical merit but was being dragged down by financial and management problems at ASK Group.

It is too early to say what plans CA has for ASK Group or any of its products, according to a CA spokesman. But CA expects the acquisition to be completed in 45 days and will then begin to assess its strategy.

Bill Shattuck, a market analyst at brokerage firm Montgomery Securities in San Francisco, said ASK Group has been suffering a credibility problem with customers because of its dire financial situation. "Users should feel better now that they've got a big company backing the product that can invest in the future and support it," he said.

CA/ASK Group snapshot

Computer Associates	
1993 revenue:	$2 billion
Employees:	7,000
Products:	Business applications, systems management software and application development tools
ASK Group	
1993 revenue:	$426 million
Employees:	2,000
Products:	Databases, gateways, application development tools and manufacturing applications

Under CA, analysts said ASK Group will have access to the financial resources its needs to continue developing Ingres. ASK Group's development track within two years will make Ingres into an object-oriented, massively parallel processing, heterogeneously interoperable database with tools to let users distribute and manage data across networks.

ASK Group products, which include manufacturing software as well as Unix-based database management and interoperability tools, are a good fit with CA's Unix-sparse product line, the CA spokesman said. The acquisition should help CA in its move to embrace client/server computing, he said.

Donald Feinberg, analyst for market research firm Gartner Group, Inc. in Santa Clara, Calif., said Ingres holds a market share of about 10% to 15% in the relational database market. But he projected that if ASK Group were not acquired, that number would fall to 0% within five years as customers flee to more stable vendors.

After purchasing Ingres in September 1990, ASK Group had difficulty meeting its debt obligations. It reported a loss of $68.9 million in the quarter ended March 31, which included a $45 million charge to cover layoffs and a corporate restructuring.

ASK Group has closed facilities and pared down its work force from about 2,500 employees a year ago to fewer than 2,100 today. A series of high-profile departures, such as the sudden resignation of Chief Technology Officer Marilyn Bohl two weeks ago, have been like "a series of final nails in the coffin" for ASK Group, Feinberg said.

"It's too bad because Ingres is a pretty good product," he said.

Ingres user Michael Hunt, senior systems analyst at the Public Broadcasting System in Alexandria, Va., said he feels a little more secure about ASK Group now that it has a strong parent but would have felt "a whole lot better if [the buyer] was anyone but Computer Associates." Hunt added that he hopes CA will let the Ingres team continue to develop the product along the track it has been following the past few years toward more multivendor interconnectivity, object support and distributed database management.

"But CA doesn't have a good track record of letting companies it buys continue on the track they were on," Hunt said. He worries that CA will freeze development or the loss of Bohl and others will blunt the product's development.

A typical CA approach is to slash 20% to 30% of the work force of a new acquisition and absorb the rest, Shattuck said.

CA has acquired a number of other database firms, including Cullinet Software, Inc. and Applied Data Research, Inc. in 1989, as well as On-Line Software International, Inc. in 1991 and personal computer database vendor Nantucket Corp in 1992.

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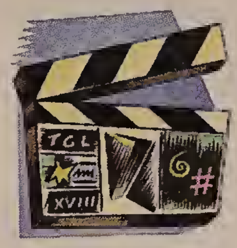

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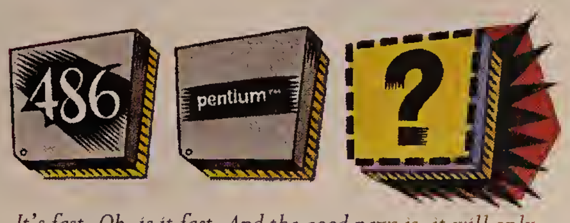

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Circle Reader Service #23

NETWORK ANALYSIS

Concord's Trakker network monitor receives an upgrade

BY SKIP MACASKILL

Marlborough, Mass.

Concord Communications, Inc. this week will raise its Trakker network analysis tool to a new level when it unveils an upgraded version that will allow network managers to become more proactive.

Instead of simply monitoring networks and compiling data, Trakker 3.0 will help net administrators prevent problems by performing long-term capacity planning and conducting net performance optimization tests. The tool will also now enable net managers to charge back-end users for net usage.

These capabilities will be made possible by Trakker's new support for a built-in relational database, enhanced user interface, tightly integrated management applications, and interoperability with other vendors' management platforms and agents. Concord was able to add these capabilities by rebuilding the product on object-oriented technology; previously, it used a command-line interface scheme.

"Trakker will now focus on providing information related to business functions such as billing, accounting and usage," said John McConnell, president of McConnell Consulting, Inc. in Boulder, Colo. "It's one thing to be able to capture data and display it in a pretty picture. It's quite another to take that data and turn it into useful, practical information."

Trakker software runs on a centralized Unix-based management console that compiles a variety of network information generated and collected by a series of software probes distributed across the net.

The new version is based on an Ingres relational database from The ASK Group, Inc. that serves as a repository for all the network information that Trakker generates and collects. Users can access that data via applications being written for Trakker by both Concord and third-party developers.

The applications under development will allow users to analyze the raw data and use it to identify potential trouble spots.

Concord miniprofile

Founded:	August 1986
Based:	Marlborough, Mass.
Primary product:	Trakker, a network monitor and analysis tool
Corporate status:	Privately held; financed by several venture capital firms
Employees:	50
Sales strategy:	Direct and through systems integrators

Concord

Using Trakker's enhanced graphical user interface at the management station, net managers will be able to generate customized reports by dipping into the system's database to correlate information. A net manager, for example, will be able to click on a network utilization icon and have that information presented in a pie chart.

From the central console, net managers will also be able to tap into information maintained by their existing net management platform. Concord will deliver, along with third-party developers, application program interfaces (API) that enable Trakker to access network maps and alarm information from several platforms, including SunConnect's SunNet Manager, Hewlett-Packard Co.'s OpenView and IBM's NetView/6000.

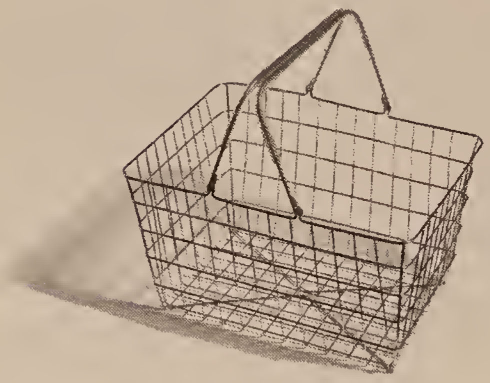
In addition, Trakker will support various software-based management agents. For example, Concord is developing APIs that will work with Simple Network Management Protocol Management Information Bases (MIB), such as MIB II and the Remote Monitoring MIB. Applications can also be developed for Trakker that will allow it to cull MIB-level information from routers, hubs and other net devices.

Trakker 3.0 may let Concord compete more effectively with its two largest competitors — Network General Corp. and HP, said Jill Huntington-Lee, principal analyst at Brandywine Network Associates in Cinnaminson, N.J.

"Technologically speaking, the new Trakker might give Concord an edge over the two big boys," she said. "If enough people take advantage of Concord's APIs, it will translate into dollars for the company."

Trakker 3.0 costs $20,000 for the base console software and $6,000 for each segment or ring monitored. It is available now.

©Concord: (508) 460-4646.



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1 Industry: (check one only)

01. ☐ Manufacturers (other)
02. ☐ Finance/Banking
03. ☐ Insurance/Real Estate/Legal
04. ☐ Healthcare Services
05. ☐ Hospitality
06. ☐ Retail/Wholesale Trade/Business Services
07. ☐ Transportation
08. ☐ Utilities
09. ☐ Education
10. ☐ Process Industries (Mining/Construction/ Petroleum Refining/Agriculture/Forestry)
11. ☐ Government (Federal/State/Local)
12. ☐ Military
13. ☐ Aerospace
14. ☐ Consultants (Independent)
15. ☐ Carriers/Interconnects
16. ☐ Manufacturers (Computer/Communications)
17. ☐ VAR/VAD/VAN/Systems Houses/ Software Houses
18. ☐ Distributors,Communications/Computers
19. ☐ Other__________

2 What is your Job Function? (check one only)

NETWORK IS Management:
1. ☐ Networking Management
2. ☐ LAN Management
3. ☐ Datacom/Telecom Management
4. ☐ IS,IT,MIS,Systems Management
5. ☐ Engineering Management

CORPORATE MANAGEMENT:
6. ☐ Corporate Management (CIO,CEO,PRES,VP, DIR,MGR,Financial Management)
7. ☐ Consultant (Independent)
8. ☐ Other__________

3 What is the total number of sites for which you have purchase influence? (check one only)

1. ☐ 100+ 3. ☐ 20 - 49 5. ☐ 2 - 9 7. ☐ None
2. ☐ 50 - 99 4. ☐ 10 - 19 6. ☐ 1

4 What is your scope and involvement in purchasing decisions for network products & services for your enterprise?

A. SCOPE (check one only)	B. INVOLVEMENT (check all that apply)
1. ☐ Corporatewide	1. ☐ Recommend/Specify
2. ☐ Multienterprise	2. ☐ Approve
3. ☐ Departmental	3. ☐ Evaluate
4. ☐ None	4. ☐ Determine the need
	5. ☐ None

5 Check ALL that apply in columns A and B:

A: I am involved in the purchase of the following products/services.
B: I plan to purchase the following products/services.

A B LOCAL AREA NETWORKS
☐ 01. ☐ Local Area Networks
☐ 02. ☐ LAN Operating Systems Software
☐ 03. ☐ LAN Services
☐ 04. ☐ LAN Storage Devices (optical,tape,disk,etc.)
☐ 05. ☐ LAN Backup systems (optical,tape,disk,etc.)
☐ 06. ☐ Network Test Equipment
☐ 07. ☐ Intelligent Hubs
☐ 08. ☐ Cables, Connectors, Baluns
☐ 09. ☐ UPS
☐ 10. ☐ Network Adapter boards
☐ 11. ☐ Peer-to-Peer LANs
☐ 12. ☐ Wireless Networks
☐ 13. ☐ SNMP Network Management
☐ 14 ☐ ATM (Asynchronous Transfer Mode)
☐ 15. ☐ Remote Access LANs

A B NETWORK SERVERS
☐ 16. ☐ LAN Servers
☐ 17. ☐ File Servers/Applications Servers
☐ 18. ☐ Print Servers
☐ 19. ☐ Communications Servers/Fax Servers
☐ 20. ☐ Data Base Servers (Oracle, Sybase, etc.)
☐ 21. ☐ Superservers
☐ 22. ☐ Terminal Servers
☐ 23. ☐ Remote Access Servers

Involved Plan to Purchase

A B INTERNETWORKING
☐ 24. ☐ Bridges
☐ 25. ☐ Routers
☐ 26. ☐ Gateways
☐ 27. ☐ Bridge/Routers
☐ 28. ☐ Intelligent Hubs
☐ 29. ☐ Communications Servers

A B COMPUTERS/PERIPHERALS
☐ 30. ☐ Micros/PCs
☐ 31. ☐ Minis
☐ 32. ☐ Mainframes
☐ 33. ☐ Pen-Based
☐ 34. ☐ Laptops
☐ 35. ☐ Workstations
☐ 36. ☐ Image Processing Workstations
☐ 37. ☐ Front-End Processors
☐ 38. ☐ Terminals
☐ 39. ☐ Printers
☐ 40. ☐ Cluster Controllers
☐ 41. ☐ Fax Machines
☐ 42. ☐ X-Terminals

A B SOFTWARE/APPLICATIONS
☐ 43. ☐ Network Management
☐ 44. ☐ Micro to Mainframe
☐ 45. ☐ Security
☐ 46. ☐ Communication/Terminal Emulation
☐ 47. ☐ Word Processing
☐ 48. ☐ Operating Systems
☐ 49. ☐ Business Applications (Finance/Mfg/HR/etc.)
☐ 50. ☐ Applications Development
☐ 51. ☐ Data Base Management
☐ 52. ☐ Spreadsheet
☐ 53. ☐ Groupware
☐ 54. ☐ EDI
☐ 55. ☐ E-Mail
☐ 56. ☐ Windows/Graphical User Interface
☐ 57. ☐ 4GL Development
☐ 58. ☐ Multimedia
☐ 59. ☐ Graphics
☐ 60. ☐ Remote Access

A B WIDE AREA NETWORKS
☐ 61. ☐ Modems (9.6K bps and over)
☐ 62. ☐ Modems (under 9.6K bps)
☐ 63. ☐ T-1
☐ 64. ☐ T-3
☐ 65. ☐ Fractional T-1
☐ 66. ☐ Data Switches
☐ 67. ☐ SMDS
☐ 68. ☐ ATM (Asynchronous Transfer Mode)
☐ 69. ☐ Matrix Switches
☐ 70. ☐ Packet Switches
☐ 71. ☐ Protocol Converters
☐ 72. ☐ Diagnostic/Test Equipment
☐ 73. ☐ DSU/CSU
☐ 74. ☐ Microwave
☐ 75. ☐ Fax Boards/Modems
☐ 76. ☐ VSAT
☐ 77. ☐ Fiber Optic
☐ 78. ☐ Satellite
☐ 79. ☐ ISDN
☐ 80. ☐ PBXs (over 1000 lines)
☐ 81. ☐ PBXs (under 1000 lines)
☐ 82. ☐ Automatic Call Distributors
☐ 83. ☐ Voice Messaging Systems
☐ 84. ☐ Videoconferencing/Teleconferencing Systems
☐ 85. ☐ Voice Response/Processing
☐ 86. ☐ Dedicated Leased Line
☐ 87. ☐ Switched Data
☐ 88. ☐ Centrex
☐ 89. ☐ E-Mail/Online Services
☐ 90. ☐ Image Processing
☐ 91. ☐ Local Services
☐ 92. ☐ WATS/MTs
☐ 93. ☐ International
☐ 94. ☐ Virtual Networks
☐ 95. ☐ Frame Relay
☐ 96. ☐ Value Added Services
☐ XX. ☐ None of the above(1-96)

6 What is the total number of A: LANs B: Workstations/Nodes in your organization?

	LANs A		Workstations/ Nodes B
1.	☐	5,000+	☐
2.	☐	1,000 - 4,999	☐
3.	☐	100 - 999	☐
4.	☐	50 - 99	☐
5.	☐	10 - 49	☐
6.	☐	9 or less	☐

7 Which of the following network platforms are currently installed/planned? (check all that apply)

NETWORK ARCHITECTURES
Installed Planned
A B
☐ 01. ☐ SNA
☐ 02. ☐ DECNET
☐ 03. ☐ MAP/TOP
☐ 04. ☐ TCP/IP
☐ 05. ☐ DCA (Unisys)
☐ 06. ☐ X.25
☐ 07. ☐ Novell IPX/SPX
☐ 08. ☐ APPC/APPN/LU6.2
☐ 09. ☐ NETBIOS
☐ 10. ☐ OSI

Installed Planned
A B
☐ 11. ☐ APPLETALK
☐ 12. ☐ OTHER__________

LAN OPERATING SYSTEM
☐ 13. ☐ LOCALTALK (APPLETALK)
☐ 14. ☐ BANYAN (VINES)
☐ 15. ☐ DCA (IRMALAN)
☐ 16. ☐ DCA (10-NET)
☐ 17. ☐ IBM (LAN SERVER)
☐ 18. ☐ IBM (PC LAN PROGRAM)
☐ 19. ☐ MICROSOFT (LAN MANAGER)
☐ 20. ☐ UNGERMANN-BASS (NET/1)
☐ 21. ☐ NOVELL (NETWARE,2X,3X,4X)
☐ 22. ☐ PROTEON (PRONET)
☐ 23. ☐ SITKA (TOPS)
☐ 24. ☐ 3COM (3+,3+OPEN)
☐ 25. ☐ ARTISOFT (LANTASTIC)
☐ 26. ☐ HAYES (LANSTEP)
☐ 27. ☐ DEC (PATHWORKS)
☐ 28. ☐ OTHER__________

LAN ENVIRONMENT
☐ 29. ☐ 4M TOKEN RING
☐ 30. ☐ 16M TOKEN RING
☐ 31. ☐ ARCNET
☐ 32. ☐ ETHERNET
☐ 33. ☐ STARLAN
☐ 34. ☐ FDDI
☐ 35. ☐ LOCAL TALK
☐ 36. ☐ 10BASE-T
☐ 37. ☐ OTHER__________

OPERATING SYSTEM
☐ 38. ☐ DOS
☐ 39. ☐ UNIX/XENIX/AIX
☐ 40. ☐ OS/2
☐ 41. ☐ OS/2 2.X
☐ 42. ☐ MVS
☐ 43. ☐ VM
☐ 44. ☐ VMS
☐ 45. ☐ MACINTOSH
☐ 46. ☐ WINDOWS
☐ 47. ☐ WINDOWS NT
☐ 48. ☐ X WINDOWS
☐ 49. ☐ SOLARIS
☐ 50. ☐ OTHER__________

8 For which areas outside of the U.S. do you have purchase influence? (check all that apply)

1. ☐ Europe 4. ☐ Australia
2. ☐ Asia 5. ☐ Middle East
3. ☐ South America 6. ☐ None

9 Which of the following hardware platforms are installed/planned in your company? (check all that apply)

	Mainframes		Minis	
	Installed	Planned	Installed	Planned
01. IBM	☐	☐	☐	☐
02. DEC	☐	☐	☐	☐
03. AMDAHL	☐	☐	☐	☐
04. AT&T	☐	☐	☐	☐
05. BULL HNIS	☐	☐	☐	☐
06. DATA GENERAL	☐	☐	☐	☐
07. HP	☐	☐	☐	☐
08. TANDEM	☐	☐	☐	☐
09. UNISYS	☐	☐	☐	☐
10. OTHER _____	☐	☐	☐	☐

MICROCOMPUTERS
(fill in the numbers)

	INSTALLED	PLANNED
11. Macintosh 20,30,40		
12. Macintosh other		
13. PCs based on Pentium		
14. PCs based on 80486		
15. PCs based on 80386		
16. PCs based on 80286		
17. PCs based on 8086/8088		
18. RISC/Unix based wkstns		
19. Other		

10 What is the estimated value of networking equipment and services that you help specify, recommend or approve annually? (check one only)

1. ☐ $100 million and over 6. ☐ $5 - $9.9 million
2. ☐ $50 - $99.9 million 7. ☐ $1 - $4.9 million
3. ☐ $25 - $49.9 million 8. ☐ $500,000 - $999,999
4 ☐ $20 - $24.9 million 9. ☐ $499,999 or less
5. ☐ $10 - $19.9 million

11 Estimated gross annual revenues of your entire company/institution: (check one only)

1. ☐ Over $10 billion 5. ☐ $50 to $99.9 million
2. ☐ 1 to $9.9 billion 6. ☐ $10 to $49.9 million
3. ☐ $500 to $999.9 million 7. ☐ $5 to $9.9 million
4. ☐ $100 to $499.9 million 8. ☐ $4.9 million or less

12 Estimated number of employees for your entire corporation: (check one only)

1. ☐ Over 10,000 4 ☐ 1,000 - 2,499
2. ☐ 5,000 - 9,999 5. ☐ 500 - 999
3. ☐ 2,500 - 4,999 6. ☐ 499 or less

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ENTERPRISE INTERNETS

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BRIEFS

TxPort will this week introduce the six-slot Prism 3060 **T-1 data service unit/channel service unit** and four new adapter cards that will provide integrated T-1 access for voice, data or facsimile transmissions.

The 3060 can hold any combination of TxPort's new voice, data and fax boards in its six local slots. It provides access to one T-1 wide-area link.

The 3060 is available for $2,595. The boards range in price from $500 for the Prism 3011 Systems Network Management Protocol management board to $1,495 for the Prism 3010 voice board.

TxPort: (800) 926-0085.

Motorola, Inc.'s transmission line of business last week rolled out a **V.34-ready** modem that the company claims can be easily upgraded, free of charge, to support the ITU-T V.34 standard.

The V.34 standard, which specifies 28.8K bit/sec transmission speeds over dial-up lines, is expected to be finalized in June, at which time users of Motorola's new V.34R modem can upgrade via a programmable read-only memory firmware swap.

At $595, the V.34R is priced about $300 higher than the entry price point for 28.8K bit/sec devices.

The modem is available now.

Motorola: (508) 261-4000.

Wellfleet Communications, Inc. and **Racal-Datacom, Inc.** last week signed a worldwide reseller agreement under which Racal-Datacom will resell Wellfleet's entire line of multiprotocol routers.

In addition, Racal-Datacom will incorporate management of the Wellfleet products into its Communications Management Series 6000 net management system.

Network Partners, Inc. has announced that its systems management agent software now supports **Sun Microsystems, Inc.'s** Solaris 2.X operating system.

The company's agent software, **Trapper,** handles monitoring, alarm thresholding and notification, and data logging, instead of relying on a Simple Network Management Protocol console to perform these tasks.

Trapper can also monitor relational databases and user applications.

It costs $495 per server and $295 per client and is available now.

Network Partners: (408) 526-9200.

The Tolly Group, an independent test lab in Sea Girt, N.J., will sponsor **Enterprise Ready '94,** a three-day conference at the Sheraton Hotel in Boston on June 13-15 that will offer enterprise networking seminars on high-speed local-area networks, net access for remote offices, intelligent hubs and high-end multiprotocol routing.

In addition to the seminars, there will also be an exhibit area where networking vendors will display their products.

For more details and registration information, call the Technology Transfer Institute at (310) 394-8305.

Digital building systems manager for Hermes

Assetworks will allow Hermes users to monitor Unix, OpenVMS workstations.

BY JIM DUFFY

Maynard, Mass.

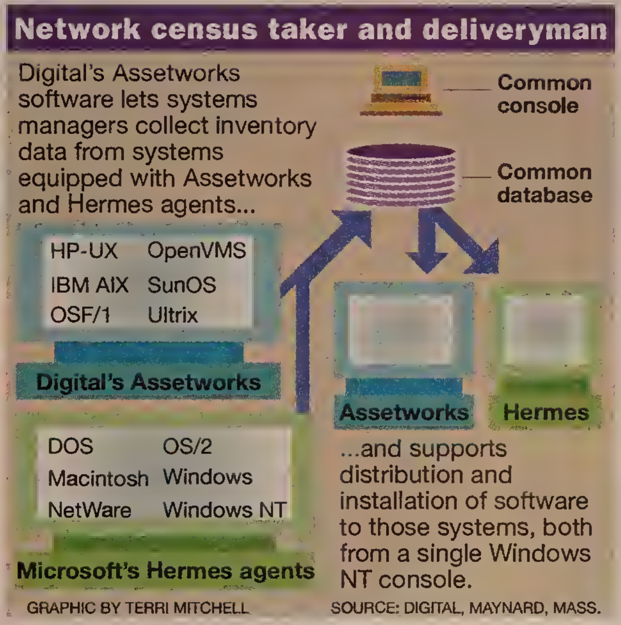
Digital Equipment Corp. is developing a software suite that works with Microsoft Corp.'s Hermes to perform inventory management and software licensing and distribution in a multivendor network.

The Polycenter Assetworks package combines the functions of separate Digital applications — Polycenter System Census and Polycenter Software Distributor — for tracking inventory and updating software on networked systems. Those systems include OSF/1, OpenVMS, Ultrix, SunOS and HP-UX, as well as IBM AIX workstations and servers.

"The idea is to integrate those functions so that, for example, software distribution becomes an intelligent process where you automatically have the inventory information available to you so you can plan your upgrade," said Barbara Liberty, business manager for configuration management at Digital.

Assetworks runs on a Windows NT workstation as an application on top of Microsoft's Hermes, which performs inventory, configuration, licensing and distribution management for Windows, Windows NT, DOS, NetWare, Macintosh and OS/2 systems. Together they let Hermes users extend their systems management capabilities beyond the personal computer environment and into the realm of high-end workstations and servers, Liberty said.

Network census taker and deliveryman


Digital's Assetworks software lets systems managers collect inventory data from systems equipped with Assetworks and Hermes agents...
Common console
Common database
HP-UX
OpenVMS
IBM AIX
SunOS
OSF/1
Ultrix
Digital's Assetworks
Assetworks
Hermes
DOS
OS/2
Macintosh
Windows
NetWare
Windows NT
Microsoft's Hermes agents
...and supports distribution and installation of software to those systems, both from a single Windows NT console.

GRAPHIC BY TERRI MITCHELL SOURCE: DIGITAL, MAYNARD, MASS.

Assetworks and Hermes share a common Microsoft database and graphical user interface (GUI). The product consolidates inventory data from Assetworks agents in the database and displays it, along with Hermes information, in the GUI. Digital is also developing Assetworks agent software that will conform to the Desktop Management Task Force (DMTF) specification for uniform systems management across multivendor client workstations and PCs.

Assetworks will support an integral license management capability over time, Liberty said. The software will also incorporate what Digital calls portfolio and budget management, whereby systems managers can gauge the expense of future systems and network purchases based on what their network is running now and what it will need down the road, Digital officials said.

Digital is also evaluating porting Assetworks to other server platforms for customers that may not want to run Windows NT, Liberty said. She did not detail which platforms are under evaluation, but analysts believe Novell, Inc.'s NetWare Management System is a likely candidate.

"To make it work, they need to have a very distributed model," said Charlie Robbins, director of data communications research at Aberdeen Group, Inc., a consul-

See Hermes, *page 17*

Magellan switch line seeks out remote branch offices

BY MICHAEL COONEY

Raleigh, N.C.

Northern Telecom, Inc. (NTI) last week extended its Magellan line of enterprise switches to the branch office.

The new Magellan Passport Model 50 lets remote users integrate legacy applications, voice and video transmissions onto Asynchronous Transfer Mode (ATM) backbones. It also eliminates the need for T-1 multiplexer-based nets, executives said.

The ATM-based Model 50 is based on the same platform as its larger brother, the Passport Model 160, which means its has two 800M bit/sec backplanes, a total capacity of 1.6G bit/sec.

Interface modules are linked to both buses so that if one fails, the switch can keep running, albeit on half the power. Unlike the Model 160, however, the Model 50 only has five slots, while the Model 160 has 16.

Those five slots support a maximum of 40 ports, which can be configured to handle any combination of voice adapters, token-ring or Ethernet local-area nets or asynchronous, bisynchronous and Synchronous Data Link Control links. For wide-area connectivity, users can configure the slots to support anything from 56K bit/sec leased lines to Optical Carrier-3 links.

Aside from cell and packet switching, the Model 50 supports source route and source route transparent bridging. Magellan bandwidth management software lets the switch dish out bandwidth as needed for voice or data applications.

"Basically, we are giving remote users the same power and flexibility of a Passport Model 160 in a smaller, more inexpensive box," said Dave Ramos, assistant vice president for NTI's Magellan marketing.

The Model 50 is also one step above NTI's Access Switch, which is positioned as the low-end feeder switch for the Magellan line (*NW*, March 21, page 6).

The high-speed wide-area links further differentiate the Model 50 from NTI's Access Switch because the Access Switch can be configured to support a maximum of 32 ports, with only one of those ports capable of supporting a 256K bit/sec leased line.

Ramos said the firm would also add support for High Speed Serial Interface, Fiber Distributed Data Interface, and additional T-1 and Ethernet adapters by next year.

Analysts said the push to expand the Magellan line is due to NTI's strategy to be a one-stop shop for enterprise connectivity.

"For the cost of a non-ATM hub, the Model 50 puts an ATM-capable switch in the remote branch office," said Anura Guruge, an independent analyst in New Ipswich, N.H. "Its ATM capabilities also eliminate the rationale that TDM is the best way to handle data and voice from remote sites."

Guruge said Magellan's ability to support bandwidth on demand removes the fixed bandwidth drawback that time-division multiplexers impose.

NTI's Magellan lineup

Product	Description	Price
Passport Model 50	Supports branch office access to high-speed ATM services.	$8,000
Passport Model 160	Provides enterprise backbone switching.	$35,000
Access Switch	Acts as feeder node to Model 160.	$2,400+
DPN-100	Provides legacy application access to T-1 links.	$7,000+
Concorde	Provides large private or carrier access to ATM services.	Not available
Gateway	Grants ATM carrier access.	Not available

TDM vendors such as Network Equipment Technologies, Inc. and Ascom Timeplex, Inc. are also adding features to their switches in an effort to compete in the same ATM markets NTI is now trying to exploit.

Ramos noted that firms specializing in TDM usually make inefficient use of bandwidth, while cell multiplexers have limited prioritization schemes.

©NTI: (919) 992-2788.

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WorldCup
June 17 - July 17
First Stage
Group Games
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Rose Bowl
Chicago
Soldier Field
Dallas
D
1
2
3
5
6
7
8
9
10
11
12
Friday June 17
Saturday June 18
Sunday June 19
Monday June 20
Tuesday June 21
Wednesday June 22
Thursday June 23
Friday June 24
Saturday June 25
Sunday June 26
Monday June 27
Tuesday June 28
Wednesday
A3 v A4
B3 v B4
A1 v A3
A1 v A4
B1 v B2
B1 v B3
A4 v A2
B1 v B4
B2
C3
D1
D2
D3 v D4
C v C4
E1 v E3
F4 v F2
E4 v
F1
F3 v F4
E1 v E4
E2
F2
2
2
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2
3
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Process Software offers new version of TCPware

BY JIM DUFFY

Framingham, Mass.

Process Software Corp. last week unveiled a new version of its TCP/IP software for Digital Equipment Corp. users that offers enhancements including support for the latest release of Digital's OpenVMS operating system.

Process' TCPware product allows OpenVMS systems to communicate with non-Digital hardware using Transmission Control Protocol/Internet Protocol and Internetwork Packet Exchange (IPX) protocols.

Version 4.1 of TCPware is the first to support OpenVMS 6.1, the latest version of Digital's bread-and-butter operating system, which started shipping this month.

Other enhancements to TCPware 4.1 include support for Digital's Pathworks 5.0 network operating system, which allows TCPware users to utilize Pathworks services, such as electronic mail, file access and transfer, and network printing.

TUNNELING FEATURES

Another feature of TCPware 4.1 is IP tunneling for IPX, which allows users to encapsulate IPX packets in TCP/IP for transmission among NetWare servers attached to a local-area net internetwork.

"It allows users to use the VAX or Alpha as an IP tunnel connection to remote NetWare LANs," said Process' Dave Rosenlund, director of product marketing. "It uses [the Routing Information Protocol], but it's not an IP router."

Also, TCPware 4.1 includes an Rprinter function, which allows users to redirect NetWare print queues to OpenVMS should a print job be destined for an OpenVMS user or if the NetWare print queue is backed up.

In addition, 4.1 includes a software module, Security-Plus, that features Kerberos user authentication services for Telnet and Rlogin sessions. Security-Plus also includes the IP Security Option, a Department of Defense specification for data confidentiality on incoming and outgoing transmissions.

Another feature of Security-Plus is address filtering, which allows users to screen datagram traffic and restrict access to and from an OpenVMS system to certain IP addresses.

To some users, Security-Plus is the most attractive component of TCPware 4.1. "The fact that they're finally integrating Kerberos into the package" makes 4.1 particularly useful for the Chicago Stock Exchange, said George Chapman, director of technical planning at the exchange. "That whole issue is something that, in the financial area, becomes critical, especially when you start talking about connections onto the commercial network."

Pricing for TCPware 4.1 starts at $4,920. Security-Plus prices start at $350. Both products will ship in June.

Process' TCPware 4.1 supports...

- Digital's OpenVMS 6.1 operating system.
- Pathworks 5.0 for OpenVMS.
- CSLIP, and token ring on Alpha.
- An increased number of Telnet sessions.
- Encapsulation of IPX in IP.
- Redirection of NetWare print queues to OpenVMS.

GRAPHIC BY TERRI MITCHELL

Hermes

Continued from page 14

tancy in Boston. "They're going to have to expand it to Novell and other domains. What end users want to be able to do is look at their portfolio — what domains do they have, what kind of technology is there, and then how do they access that information. This product would appear, with its Hermes connection, to be the first step of that."

Users are anxious for the capabilities Assetworks delivers because they have trouble keeping track of the ever-increasing makeup of their nets. But Digital is not the only game in town.

"There are a lot of players in the market out there, not the least of which is Microsoft itself," said Matt Holdrege, senior network specialist at PacifiCare Health Systems, Inc. in Cypress, Calif. "So our company, and a lot of other companies, are going to be very interested in this kind of technology in the future. At this point, we'll be assessing vendors when they start bringing products to market."

Digital plans to ship Assetworks Version 1.0 at the same time that Microsoft ships Hermes, which is expected to be July or August. Pricing for Assetworks 1.0 was not disclosed.

©Digital: (800) 344-4825.

Comments?

See "Contacts" box on page 2.

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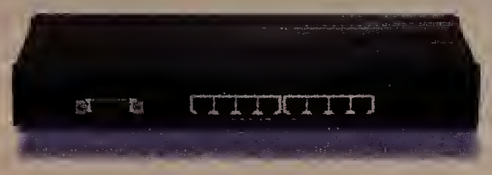

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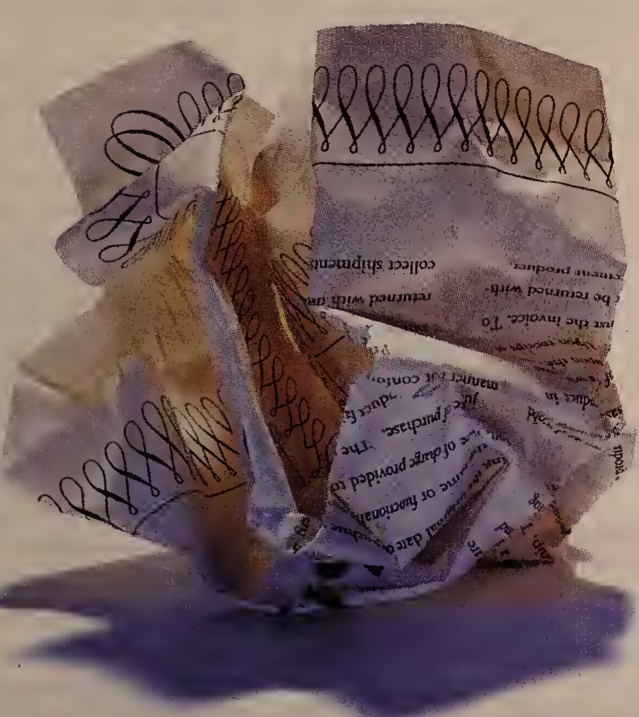

Hewlett-Packard's lifetime warranty excludes power supply and fan assemblies.

3Com's lifetime warranty excludes power supply and fan assemblies.

Asanté's warranty doesn't cover the life of the product.

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Circle Reader Service #15

THE INTERNET

by Ed Krol

Weaving your way through the Web

People often seem to forget that learning is a lifelong additive process. They are given the task of learning a new technology and fail to apply their years of experience to the task, making it seem a lot harder than it really is.

I've seen this happen to many people, such as the COBOL programmer who suddenly thinks the same hardware takes on different properties because he has switched to programming in C. I think the same thing happens when people switch to using the Internet from a traditional library.

One of the most frequent requests of people on the Internet is, "What's out there in Mosaic?" (the new high end presentation package for World-Wide Web resources). The problem with the Web is that there is no starting point or top of the tree — it's a mesh of information. This causes many people to act like they are trying to enter a cold pool. They keep circling the periphery, sticking their toe in to find a warm spot.

When you do research in a library, there is one basic algorithm to finding information on a given topic. First, you look in an index to find a document about the topic.

Second, you look in that document for citations pointing to other sources. Those sources may lead to others, and so on.

The same techniques should apply to any such mesh of information, and they are certainly applicable to the World-Wide Web.

There are any number of indexes to documents in the Web. Some are for specialized users, pointing at commercial resources, engineering resources and so forth, trying to give a complete list of all that's out there on the topic. Others are made for people who are just browsing, with one or two resources on each of many topics. It doesn't matter which of these you start from. Just start, and you'll find something.

Once you do, more often than not it will have pointers to other documents about the same topic. So when you are done looking at the current document, just follow the pointer and repeat as desired.

In a traditional environment, following citations can be frustrating. Frequently, you find citations for things you would really like, but they are not available at your library.

If they are really worth it, you might be able to have your library order it, but it takes time.

The same thing is true of the Internet, although following citations is easier — you just point and click. Your Web browsing software will also keep track of what resources you have already visited, remember the good ones and allow you to make annotations associated with a document.

The problem is that sometimes you point and click but get nowhere. You frequently have to try again later.

The secret to success is persistence, which is another lesson most people forget in an online environment. If the circulation system at a library says the book is in but it's not on the shelf, most people try again later. When they try to access something on the Internet but can't get to it, they think, "This network doesn't work."

Going out on a limb, I would venture to guess that the Internet is one of the most complex and fault-tolerant things ever built. At the risk of sounding like Carl Sagan, there are billions and billions of pieces to it. At any point in time, some of them will be broken, but by tomorrow they will likely be fixed. So if you hit a snag, take the rest of the night off and try again in the morning.

➾Krol is author of *The Whole Internet* (O'Reilly & Associates, Sebastopol, Calif., 1992) and assistant director for LAN deployment at the University of Illinois at Urbana-Champaign. He can be reached at e-kroluiuc.edu.

Bull moves to wireless packet data

BY ELLEN MESSMER

Billerica, Mass.

Bull NH Information Systems, Inc. is shifting from paging to wireless packet data to keep in touch with its 800 field service engineers, convinced that this plan will lower its costs and bring faster service to customers.

Bull next month will set up a radio frequency gateway here to tie its Unix-based field management dispatch system into the RAM Mobile Data net. Customer service operations personnel will then be able to send message alerts and work orders to Bull technicians in the field equipped with Motorola, Inc. InfoTac wireless data modems and laptops.

"The engineer is freed up because he can conduct his work more effectively without having to search for a phone and take down the work order," said Don Wheeler, director of systems at Bull's customer service division.

Bull said the project should pay for itself in 18 months.

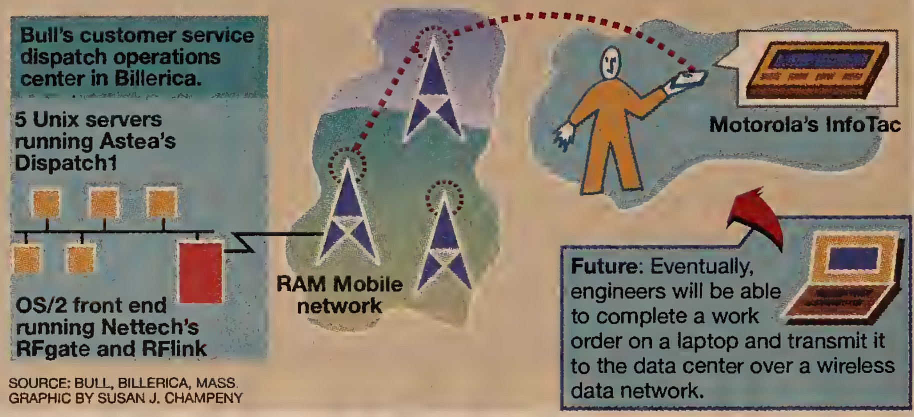
Price was a major factor in choosing RAM Mobile over the competing ARDIS Co. service. "In the end, RAM [Mobile] gave us a pricing package that makes it more economical," Wheeler said.`"In addition, they demonstrated they are willing to extend radio coverage where it's needed."

The InfoTac wireless modem was also key to the project. With its LCD screen and limited keypad, the modem can receive and store short messages and send any of 128 predefined messages.

The Bull dispatch center will transmit an abbreviated form of a work order to the engineer's InfoTac over the RAM Mobile net. To get a full copy of the work order, the service engineer would then open up his laptop, which would be running Nettech Systems, Inc. client software, RFchat. After handling the problem at the customer site, the engineer will fill in the work order with a report or request for parts and send it back.

Bullish on wireless data

Starting next month, field service engineers at Bull will be paged over the RAM Mobile wireless network and receive short forms of work orders on their Motorola InfoTac modems.


Bull's customer service dispatch operations center in Billerica.
5 Unix servers running Astea's Dispatch1
OS/2 front end running Nettech's RFgate and RFlink
RAM Mobile network
Motorola's InfoTac
Future: Eventually, engineers will be able to complete a work order on a laptop and transmit it to the data center over a wireless data network.

SOURCE: BULL, BILLERICA, MASS.
GRAPHIC BY SUSAN J. CHAMPENY

Bull did have to overcome one limitation of the InfoTac modem — its inability to initiate a message on its own; the device can only respond to messages it receives over the RAM Mobile network because it is not designed to let users input addresses.

Bull had Nettech add software to its RFgate product to let InfoTac users send messages whenever they want after a onetime initialization of the device over the RAM Mobile net. RFgate provides the front end for Bull's customer operations center field service management software, Dispatch1 from Astea International, Inc.

Boris Fridman, president of Princeton, N.J.-based Nettech, said an address list of designated InfoTac users will be sent to each InfoTac device during initialization. "In reality, each InfoTac message is sent to the RFgate server, which reroutes the message to the correct InfoTac user," said Wes Thielke, RFgate project manager.

In the first phase of the project, which began last month, Bull outfitted 44 engineers in five cities with InfoTac modems and laptops running Nettech's Windows-based RFchat application.

Next month, Astea will add its Remote1 software to the five Dispatch1 Unix servers at Bull, tying the field service management system into the the RAM Mobile entry point, the RFgate OS/2 server.

By this summer, the 300 customer service representatives at Bull who take customer calls will be able to transmit the work request and description from their laptops directly to the field service technician over the RAM Mobile net.

Although Bull is eager to move from paging to wireless data, it cannot forgo paging entirely since paging services have more land coverage than does RAM Mobile at present. Rather, Bull will run both systems in parallel as it gains experience with wireless data.

Symplex line uses switched services to interconnect LANs

BY SKIP MACASKILL

Ann Arbor, Mich.

Symplex Communications Corp. last week unveiled a series of connection-oriented WAN access switches that use switched digital services such as Integrated Services Digital Networks to interconnect LANs across the wide area.

The new Direct Route (DR) family combines switched services with bandwidth aggregation, inverse multiplexing and data compression to transfer data between local nets on a point-to-point basis, rather than through multiple-hop links established by conventional leased-line routers and bridges.

"These products will play in the small to mid-range sites, where ISDN and switched 56K bit/sec services are available," said Val Sribar, senior research analyst at the META Group, Inc., a consultancy based in Reston, Va. "There has to be an alternative to placing routers everywhere, and this approach is a viable."

DR-5 is a five-slot data center switch that can support as many as 160 remote sites, offering 1.024M bit/sec of bandwidth for each connection but higher effective throughput with compression that ranges from 2-to-1 to 20-to-1. The DR-2 is a two-slot version of the DR-5 that is geared to large regional sites. It supports as many as 64 remote locations at the same 1.024M bit/sec rate per link.

Both products support Ethernet and token-ring LANs and offer interfaces for both Primary Rate Interface (PRI) and Basic Rate Interface (BRI) ISDN, frame relay and leased lines. In addition, the DR-5 provides support for serial lines.

The DR-1 is a fixed-port device for small remote sites that can handle up to eight connections concurrently, with 512K bit/sec for each link. It will initially support Ethernet nets and provide ISDN BRI, frame relay and leased-line interfaces.

The DR line offers several optimization features, including bandwidth on demand, which lets the device automatically dial up more connections as needed. If a user needs to transfer a large bulk file, for example, DR can establish several dial-up links and aggregate the capacity into one larger pipe.

Looking at the price tag

Product	Pricing	Availability
DR-5	$7,999	Now
DR-2	$6,999	Now
DR-1	$2,999	3Q '94

Charlie Robbins, director of communications research at Aberdeen Group, Inc., a consulting firm in Boston, said Symplex's switching approach to internetworking has several advantages over traditional routers.

"Symplex has the early track on using switching to get the job done, especially in terms of performance," he said. "If latency is an issue for users, this method can provide better performance than a router because it eliminates the need to store and forward packets and do multiple hops. Since switched services are less expensive than leased lines and DR is priced well below comparable routers, users can also realize a cost savings."

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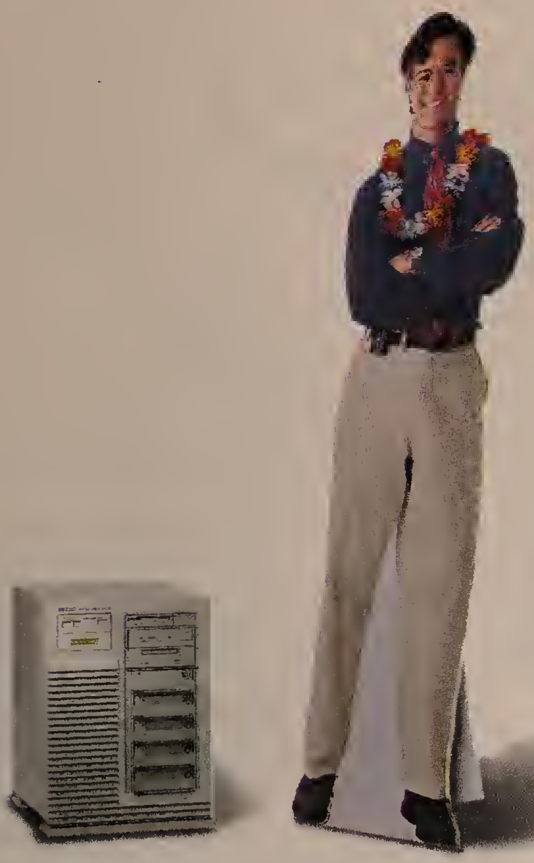

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intel inside

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HP NetServer LC • 66-MHz Intel Pentium processor, 100-MHz IntelDX4 processor, 66-MHz Intel486 DX2 processor • Automatic Server Restart • 8-MB and 16-MB RAM standard, 192-MB maximum • Up to 256-KB write-back cache • 1 PCI, 1 PCI/EISA-combo, 4 EISA I/O slots • 5 mass storage shelves • Integrated EISA Fast SCSI-2, IDE and video controllers • Designed-in security, serviceability, and cooling features • Tested and certified on all major network operating systems

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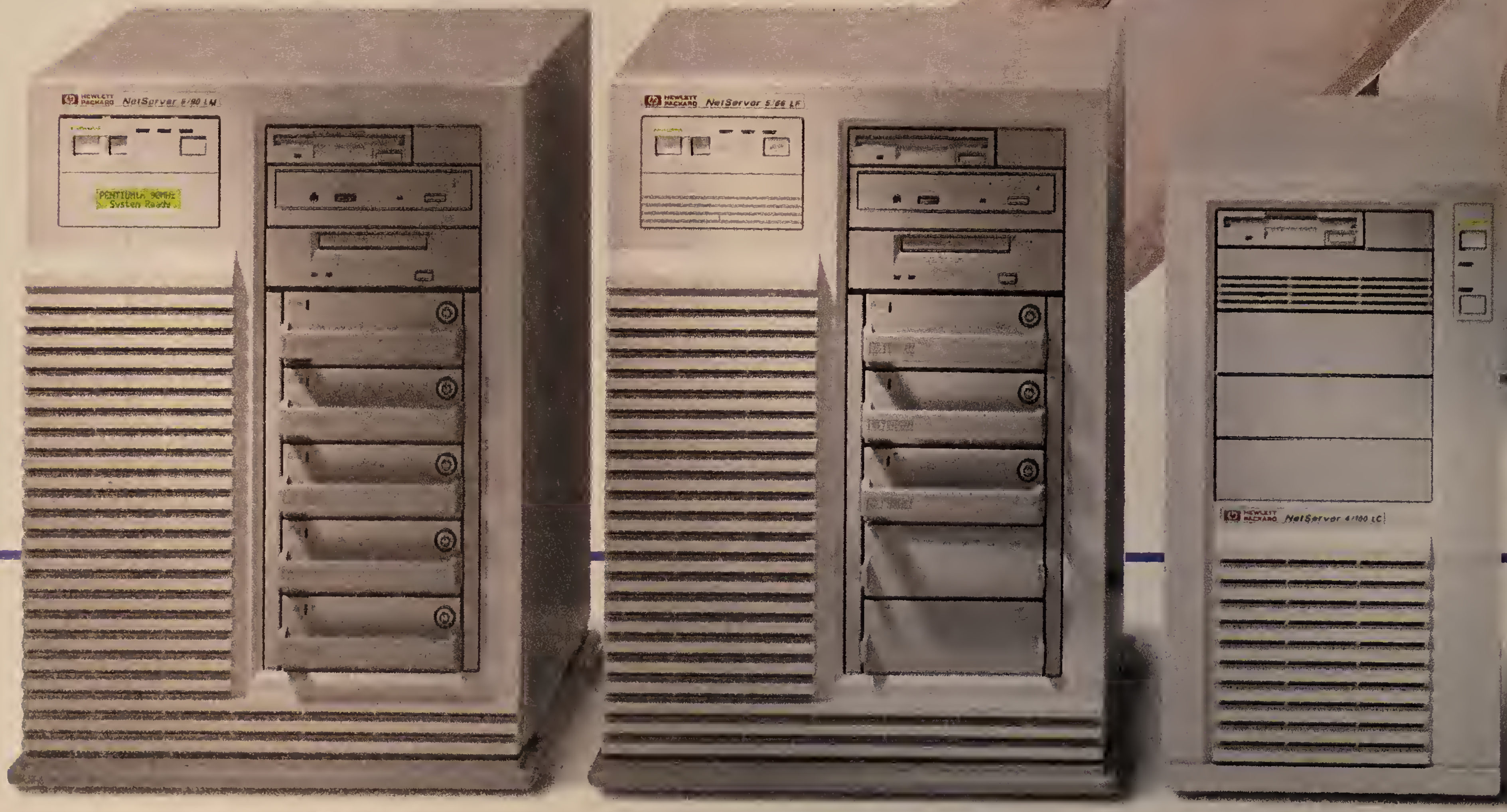

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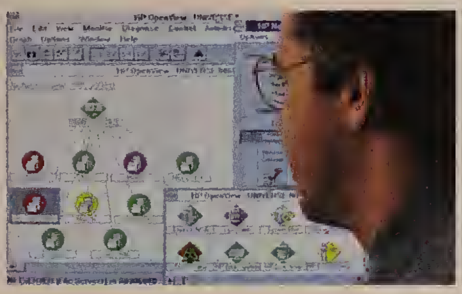

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T.120 standard suite gives data sharing the interoperability push

BY ELLEN MESSMER

Geneva

A soon-to-be-finalized standard for real-time sharing and annotation of data and images between PCs, videoconferencing and audiographics systems promises to usher in a new era of interoperability for electronic meetings.

Known collectively as the Multi-Layer Protocol, the T.120 standards suite is expected to reach ''stable status'' at the International Telecommunication Union (ITU) standards meeting in June, a point where no further technical changes are made.

The foundation for multivendor, real-time data sharing in mixed local- and wide-area conferencing environments, T.120 is winning widespread industry support, with products expected by year end.

BAKER

Lack of a standard has locked users into proprietary videoconferencing, audiographics and desktop conferencing systems because each vendor's product uses a unique method of sharing data, images, applications and facsimile on a real-time basis. Likewise, they have different methods of supporting a shared whiteboard, a clear screen for using drawing tools.

But T.120, which supports data sharing over various kinds of networks, could bring these three methods of conferencing together as never before.

''This data-sharing standard is written so that a whiteboard can talk to a PC, and a PC can talk to a videoconferencing system,'' said Pat Romano, director of software development at Polycom, Inc. and a technical editor of the Still Image standards document.

PictureTel Corp., DataBeam Corp. and Polycom — companies that played a role in developing the standard — are among many in industry that plan to offer T.120-compliant conferencing products and test them for interoperability by year end.

''At the desktop, you want to do whiteboarding, point and annotate, and ultimately, application sharing,'' said Richard Baker, chief scientist at PictureTel, which manufactures videoconferencing products ranging from large room systems to personal computer-based systems. ''The piece that's been missing from the videoconferencing standard is the data side, and that's now in sight.''

Conferencing software written to T.120 will let users running PC applications, such as a spreadsheet or word processing program, display their data in still frame format or on a real-time basis at remote T.120 terminals.

Polycom, the San Ramon, Calif.-based manufacturer of the SoundStation multipoint audioconferencing device, plans to ship a T.120-compliant audiographics conferencing product designed to let users ship graphics to each other during a conference session.

''The standard provides a network-independent multipoint communications service that supports up to 65,000 virtual links for data,'' said Neil Starkey, executive vice president and chief technical officer at DataBeam, a Lexington, Ky.-based company that makes a shared whiteboard product called FarSite.

Using the Multi-Layer Protocol, data can be sent over any standard analog or digital public-switched network service, including X.25 and Switched Multimegabit Data Service, using TCP/IP and OSI transport protocols.

Other popular protocols, such as Novell, Inc.'s Internetwork Packet Exchange (IPX), will be issued as an extension to the standard by the Consortium for Audiographics Teleconferencing Standards, an industry consortium that Starkey chairs.

Multipoint data-sharing meetings will require a multipoint communications unit (MCU), which is a multimedia bridge that can either be a program running in a personal computer or a physical device connected to the telephone network, Starkey said.

''There are no restrictions on the number of audio, data and video ports that may be on a single MCU,'' Starkey said. ''This permits such devices as graphics-only MCUs to exist in a data network or a dial-up video-audio MCU in the telecom network.''

Video battles

An international battle over a proposed videoconferencing standard threatens to produce a schism in the market between U.S. and European players.

U.S. industry wants U.S. Department of State officials at International Telecommunication Union (ITU) meetings here this week to vote ''Yes'' on a standard developed in the U.S. for remote control of cameras.

But some countries at the ITU meeting, particularly the U.K. speaking on behalf of BT, are objecting to the camera control specification because it does not work over the Multi-Layer Protocol (MLP) stack defined in the T.120 series of standards (see story, this page).

One negative vote could derail the far-end camera control proposal, which was developed by AT&T and PictureTel Corp. The spec is contained in two technical documents called H.Data Link Layer (H.DLL) and the H.Far End Camera Control.

BT worries that H.DLL could be an ''incompatible alternative to the T.120 series for dealing with a wide range of multimedia applications,'' not just camera control.

''We ardently hope the multimedia community will pull together on this one,'' BT said in a communique to ITU members.

U.S. firms argue that far-end camera control is difficult to do over MLP because it adds a slight, unpredictable delay when a user presses a camera control button.

''You need predictable response rates,'' said Richard Baker, PictureTel's chief scientist. ''We needed a slightly different protocol than MLP.''

Whatever the outcome of the vote this week on far-end camera control, the end result may be the first time the videoconferencing community has been seriously split on a standard — not a good omen for users interested in multimedia conferencing.

BY ELLEN MESSMER

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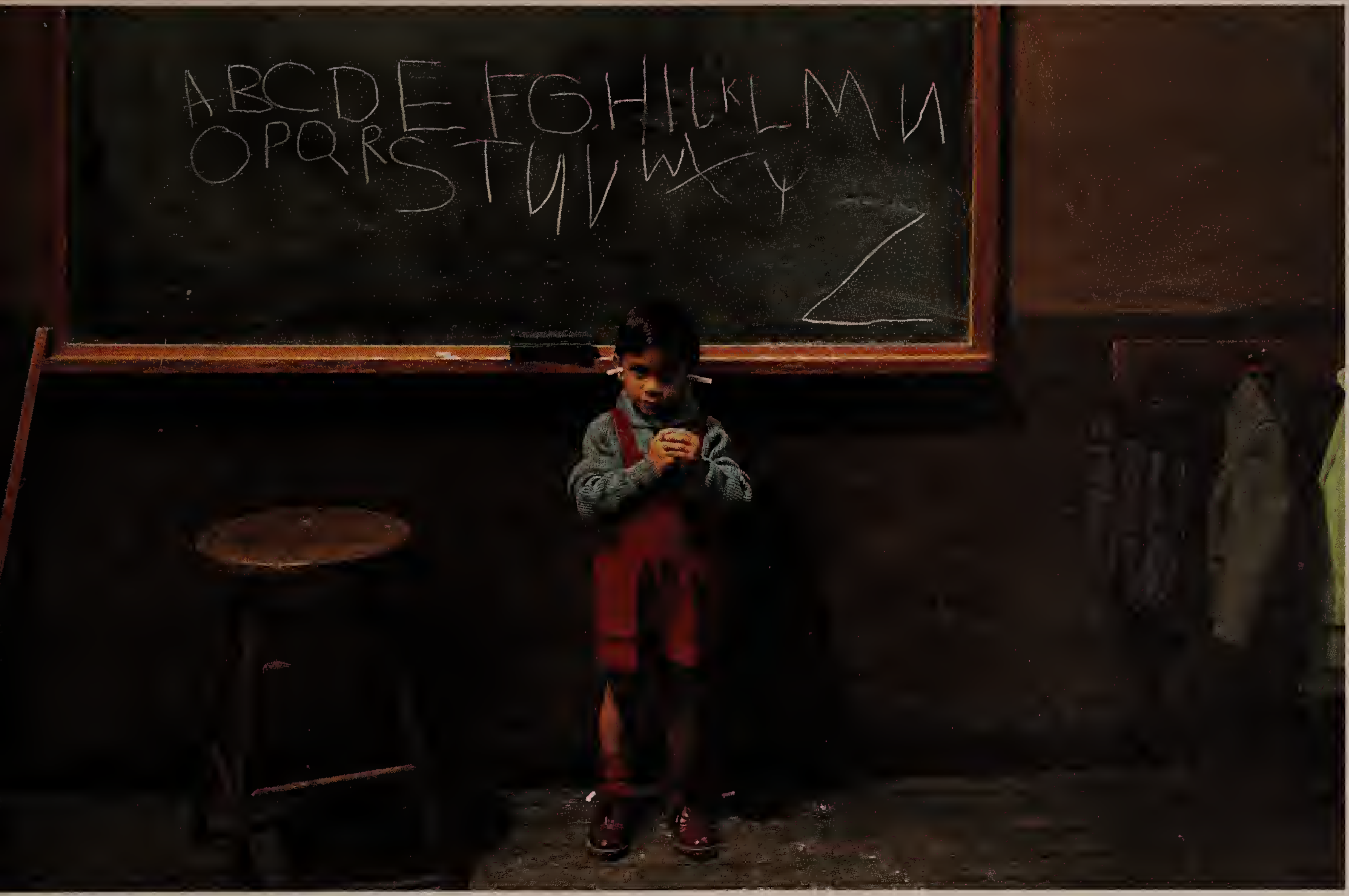

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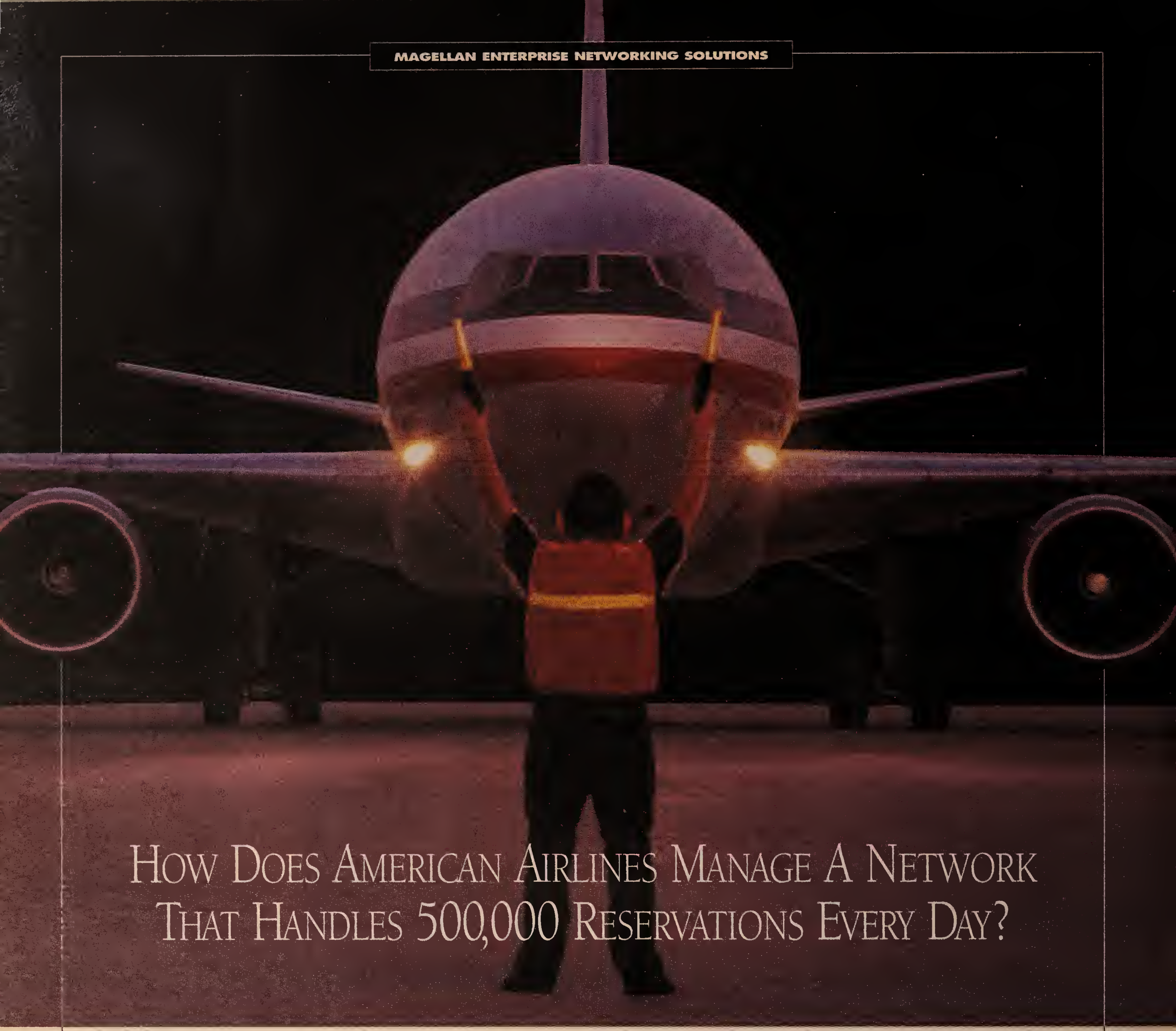
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LAN WORLD

A Special Monthly Section for LAN Decision Makers

INSIDE LANWORLD

- Set afloat by Novell, NetWare 2.X users mull their future options. **Page L2.**
- IBM looks to low-end server mart. **Page L4.**
- Vendor has storage NLMs in-store. **Page L6.**
- Novell and Microsoft talk up DCE, but their proprietary agendas come first. **Page L7.**
- Building virtual LANs is one thing, trying to manage them is another. **Page L10.**
- Artisoft readies NetWare-based server for peer-to-peer users. **Page L12.**

BRIEFS

Novell, Inc. last week enhanced its **mainframe electronic mail** connectivity offerings with a new NetWare Global MHS-to-PROFS gateway and an updated SNADS for NetWare Global MHS gateway. Both are NetWare Loadable Modules for NetWare 3.X or 4.X servers and work in conjunction with Novell's Global MHS and NetWare for SAA products.

The NetWare Global MHS-to-PROFS gateway lets users running IBM's Professional Office System or OfficeVision exchange messages, documents and files with NetWare users running Novell's Global MHS. The new version of the Systems Network Architecture Distribution Service gateway now supports NetWare 4 in addition to extended messaging and message-header generation in a format familiar to IBM users. Both modules will be available by June. The NetWare Global MHS-to-PROFS gateway will cost $4,995, while the new version of the SNADS for NetWare Global MHS gateway has been reduced from $6,995 to $4,995.

Novell: (800) 638-9273.

FTP Software, Inc. this week can proudly strut around the streets of North Andover, Mass., when it is named to *BusinessWeek's* annual list of the 100 hottest small companies in the U.S. The networking software firm cracked the top 10, staking claim to the ninth position on that list. The company's fast growth led to its selection, with earnings jumping 42% this year to $23 million while revenue climbs 50% to $87 million. Other networking companies on the list include Asante Technologies Corp. (19), NetManage, Inc. (22) and Xircom, Inc. (56).

The **IBM PC Co.** this week will introduce **NetFinity 2.0,** a new version of its object-oriented application suite for managing local and remote LAN servers, desktop machines and mobile personal computers. While the original version released last fall only supported OS/2 PCs and IBM OS/2 LAN Server 3.X servers, the new version supports Microsoft Windows 3.1 clients and Novell, Inc. NetWare 3.X and higher servers.

NetFinity 2.0 also features Simple Network Management Protocol alert and paging functions. The product can feed alerts to other LAN management products that support SNMP, such as IBM's LAN NetView, as well.

NetFinity 2.0 will begin shipping in June. NetFinity Manager, the server software, comes with a single copy of the client software, NetFinity Services, for $850.

IBM: (800) 772-2227.

Internet hackers beware: corporate LANs protected

Fire walls secure LAN from suspicious Internet traffic.

BY ERIC JENSEN

Visit the downtown of any urban area and you will see them — steel bars placed over windows and doors to keep out intruders. In the city, it's simply part of the cost of doing business.

It isn't much different on the Internet. With more than 20 million users worldwide, it's larger than any city in the world. And like a city, it has its own share of thieves and vandals. To place bars over their Internet connection, organizations are turning to fire walls.

A fire wall is Internet-speak for a security device or set of devices placed between an organization's local-area network and its Internet connection.

Its primary purpose is to prevent unauthorized access of corporate LANs from the Internet by screening data packets and providing application proxy services. Packets are screened to disallow suspicious traffic. Proxy services, which are application-specific, maintain complete control and an audit trail of all permitted outbound and inbound traffic.

For example, a basic packet-screening function is to block User Datagram Protocol packets from passing through the fire wall and disallow establishment of any incoming Transmission Control Protocol connections. This prevents hackers from probing the internal network.

A common proxy service is to force all outgoing File Transfer Protocol (FTP) sessions through the fire wall. An internal user must first connect to the fire wall and then instruct the fire wall to establish the connection. This is necessary since a file transfer typically requires an incoming TCP connection, which is disallowed by packet screening.

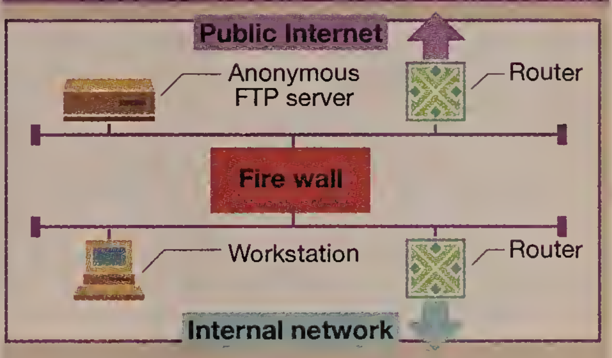
THE BARS WORK

Vinny Costa, Advanced Technology Manager at Pfizer, Inc., said the company's fire wall is a fundamental safety requirement if you are connecting your LANs to the Internet. Pfizer, a Fortune 100 pharmaceutical firm, uses the Internet to connect its researchers to the university and government communities. The company uses a fire wall product from Raptor Systems, Inc. to keep intruders out while letting their researchers conduct business.

Costa said Pfizer's fire wall has given it confidence to use the Internet. Without it, they would not be connected or limited to simply electronic mail links. With it, Pfizer is now considering giving its legal and library divisions Internet access.

See **Internet**, *page L8*

Securing LANs from Internet rogues



Fire walls protect corporate LANs from Internet intrusions by screening packets for suspicious traffic and providing application proxy services to maintain program control and audit trails.

Low-end token-ring hub mart slides for third straight quarter

BY SKIP MACASKILL

San Jose, Calif.

Maybe someone should tell token-ring users that the industry is in the midst of a stackable hub craze.

Sales of stackable, fixed-port hubs for token-ring nets actually fell for the third straight quarter, bucking a trend among users to snap up stackable hubs that has been fueled largely by Ethernet hub sales, according to market research firm Dataquest, Inc. here.

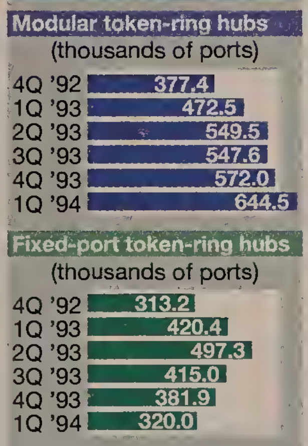
While nonstackable, chassis-based hubs for token-ring nets have shown growth during the past couple of quarters, shipments of stackable workgroup and remote office token-ring hubs have fallen steadily.

Tam Dell'oro, a senior industry analyst at Dataquest, said the market's softness may be related to a broader move away from token ring to Ethernet due to a variety of factors. Among other things, token-ring products are typically more expensive than their Ethernet counterparts.

"In many cases, branch offices can't afford to spend the money to implement token ring, even though it may be an SNA environment," she said. "These sites are turning to Ethernet, which represents a major shift in attitude.

On the other hand, corporate data centers and other sites that are not so price-sensitive, are increasing their investments in token-ring hubs, Dell'oro said. But these locations tend to buy chassis-based hubs.

Token-ring hub ups and downs



While high-end token-ring hub port shipments continue to climb, low-end fixed-port hub shipments have lost ground in recent quarters.

SOURCE: DATAQUEST, SAN JOSE, CALIF.

Ethernet also may be getting a close look from branch office users because of new, innovative technologies that can enhance performance and increase throughput of these nets, she added. Ethernet switching, full-duplex Ethernet and 100M bit/sec Ethernet technologies are all incentives to invest in Ethernet, while similar token-ring technologies are still on the horizon.

Tom Dolan, vice president of sales and marketing at Westcon, Inc., a net product distributor in Eastchester, N.Y., said the lack of a focused migration path to higher speed technologies may be slowing token-ring purchases.

"If you want to go faster than your 16M bit/sec token ring now, the only really viable option is FDDI," he said. "Users are only adding token ring to existing token-ring environments or their SNA shops. For any new installation that is unencumbered by a glorious past, users are turning to Ethernet."

Dell'oro also pointed out that IBM's de facto embrace of Ethernet has had a negative impact on token-ring sales. "When IBM started rolling out Ethernet products and paying more attention to that technology, it meant users committed to Big Blue no longer had to look at just token ring," she said.

IBM, however, has a different view. "The area of the market that is actually declining is with the [multistation access units]," said Bob Roth, manager of campus network systems for IBM's Networking System division. "And users in that area are not moving away from token ring; they're simply upgrading to more intelligent devices that offer comprehensive management and fault tolerant features."

Many of those users upgrading are going directly to chassis-based token-ring hubs, which may be why the Dataquest figures show high-end growth and a declining market at the low end, according to Martin Taylor, director of product marketing at Madge Networks, Inc.

The three-quarter dip may end up being a glitch in the market until newer token-ring technologies begin to emerge, according to Stan Schatt, local net services director at Computer Intelligence/InfoCorp, Inc.

"There is an awful lot of interest from the users in switched token ring and higher speed token ring, so as those technologies materialize, — and pricing continues to drop — users will evaluate them," he said. "Token ring is certainly not dead."

Weighing NetWare 2 upgrade options

Choices will include higher level versions, Banyan's ENS and other NOSes.

BY CHRISTINE BURNS
AND CARYN GILLOOLY

Now that Novell, Inc. has officially discontinued its NetWare 2.X line, customers still using the product, totaling more than one million nodes, have some serious choices to make.

Most will choose to upgrade to NetWare 3 or NetWare 4 simply because these higher end versions are probably used in other parts of the organization, and the consistency will make it easier for users to contend with the change.

Of those that do stay within the fold, it seems that most will go to NetWare 3 despite Novell's hope to move them up to Version 4. At this point, most users still think that NetWare 4 is too unstable and unproven.

But there are other options.

"The 2.X market is wide open right now because those people have to be looking for a place to go," said Stan Schatt, service director for local-area network research at Computer Intelligence InfoCorp., Inc., a research firm in La Jolla, Calif.

For example, some users may choose to change out their network operating systems for products such as Artisoft Corp.'s LANtastic peer-to-peer system. This would provide stability as well as an upgrade path if the organization continues to grow.

Another option is to implement Banyan Systems, Inc.'s Enterprise Network Services (ENS), which will let users of different NetWare versions within an organization link them using Banyan's directory services.

Despite the options, monetary constraints may leave many users trying to make do with NetWare 2.

UPBEAT USERS

For some NetWare administrators, Novell's discontinuation of the 2.X line was just the excuse necessary to win management's approval to upgrade. "This is just a natural migration to us, and we already had it planned," said Paul Shirley, director of clinical information systems at Braintree Hospital in Braintree, Mass.

The hospital is currently running a 100-user human resources net on Advanced NetWare 286, "which is as old as the hills," and a separate five-user NetWare 2.2 network, both of which are connected by the hospital's mostly NetWare 3.12-based net, Shirley said.

For some NetWare administrators, discontinuation of the 2.X line was the excuse needed to win management's approval to upgrade.

"I don't like being on these platforms anyway," he added. "I intended at budget time to ac-commodate moving those platforms to NetWare 3.12."

Although Shirley said Novell has "two good platforms to choose from, 3.X and 4.X," he also said NetWare 4.X is "not there yet" and that he will upgrade the 2.X systems to NetWare 3 like the rest of the organization.

Someone who also has 2.X-to-3.X upgrade plans is Ira Goldstein, manager of LAN services at the Northeastern Regional Information Center in Albany, N.Y., a cooperative that coordinates all of the networks for the public schools in upstate New York.

"We are in the process of migrating our 56 [NetWare 2.X] networks to 3.X," he said. "All of the new installations for the past six months have been 3.11 or 3.12."

Goldstein, too, said his organization considered moving to NetWare 4, but "from what we've [heard] about the problems with it, we don't want to move into that yet."

OTHER OPTIONS

David Tipton, lead network operator for the Orange County Public Schools in Orlando, Fla., switched from NetWare 2.X to LANtastic about 18 months ago. The network currently supports 22 workstations running computer-aided design applications.

"We never even considered upgrading to NetWare 3.X," Tipton said. "It was hard to use [and] hard to share anything."

Tipton recommend that for users wanting something easier to use than NetWare that offers just as much functionality, then moving to a peer-to-peer environment might be the right solution.

"It's easier to share printers, drives, plotters, modems A we're sharing everything," he said. "I didn't want a bigger set of Dixie cup and twine like I had with NetWare 2.X. With 3.X, I just didn't see it getting any easier to use or maintain, it was just getting bigger."

See **NetWare 2**, *page L4*

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Circle Reader Service #6

IBM to show off new server for stand-alone local networks

BY CHRISTINE BURNS

Somers, N.Y.

The IBM PC Co. this week will unveil a personal computer-based LAN server designed for stand-alone local networks and one that strays from the company's proprietary Micro Channel Architecture (MCA) bus design.

The IBM PC Server is both the first IBM server to address the market for small LANs supporting an average of 12 end users as well as the company's first server based on the Extended Industry Standard Architecture (EISA).

David Nichols, director of client/server solutions at IBM PC, said Big Blue has determined the market for stand-alone LAN servers to be as large as that for workgroup servers tied to enterprise nets.

Both markets, according to IBM figures, stood at approximately $70 million last year. IBM's PC business unit has already positioned its Personal System/2 Server 85 and 95 MCA-based departmental servers as workgroup servers.

"We've provided a basic server that is a great starting point for small businesses, but has plenty of room to be either customized for a particular use or expanded as the business grows," Nichols said.

IBM chose EISA over MCA because users of the IBM PC Server do not need the advanced networking features offered by an MCA-based computer, such as parity checking on the bus and advanced server management capabilities.

"IBM's switch to support EISA was not a surprise to me," said Jeff Davis, senior director of technical services at computer equipment distributor Ingram Micro, Inc. in Santa Anna, Calif.

"I don't see them as abandoning MCA, but what they are doing is honing in on the market momentum out there for EISA-based servers," he added.

The IBM PC Server family comprises two models, one high-performance and one basic.

The high-performance model, referred to as the PC Server Pentium 60 MHz, runs on a 60-MHz Pentium chip and has 16M bytes of memory that's expandable to 192M bytes. This server also has 256K bytes of write-back cache and will be available with or without a preinstalled 1G-byte Small Computer System Interface (SCSI)-2 drive.

The basic model, called the PC Server 486DX2/66, runs on a 66-MHz Intel Corp. 486DX2 processor with 8M bytes of memory that's expandable to 128M bytes, as well as 256K bytes of write-back cache. This model can be upgraded to support an Intel Pentium processor and will be available with or without a preconfigured hard drive.

The Pentium model will sell for $3,899 with no hard drive and for $4,999 with a 1G-byte SCSI-2 drive. The PC Server 486DX2/66 without a hard drive costs $2,499. The same model with a 728M-byte Integrated Drive Electronics drive will be priced at $3,099.

Both models will begin shipping in three weeks.

©IBM: (800) 426-2468.

NetWare 2

Continued from page L2

Another attraction to LANtastic is its recently added ability to coexist with existing NetWare LANs. Artisoft has included the NetWare Core Protocols in LANtastic 6.0. This means customers can keep NetWare 2.X in place and upgrade to LANtastic without swapping anything out while providing transparent connectivity between the two environments.

Banyan also has a shot at the 2.X market with ENS.

"This opens another door for Banyan," said Schatt. "Banyan could go into mixed [NetWare] sites and say, 'We can give you essentially the functionality of 4.X in terms of directory services and you don't have to upgrade from 3.X or 2.X.'"

NO OPTIONS

Pikes Peak Community College in Colorado Springs is also a NetWare 2 user. John Atterberry, telecommunications electronics specialist at the college, said he would like to upgrade to NetWare 3.12 and is also vaguely considering Banyan's ENS.

"But what we do will depend on money more than anything else," he said. "We may just decide to keep running our [2.15] nets until they're totally unusable."

Other users are in the same predicament.

"We have NetWare 2.15a, 2.15c, 2.2, 3.11, 3.12 and a 4.0 test server," said Leon Wimbley, network administrator at the University of Nevada-Reno. "But we're not moving to upgrade because, after all, money rules."

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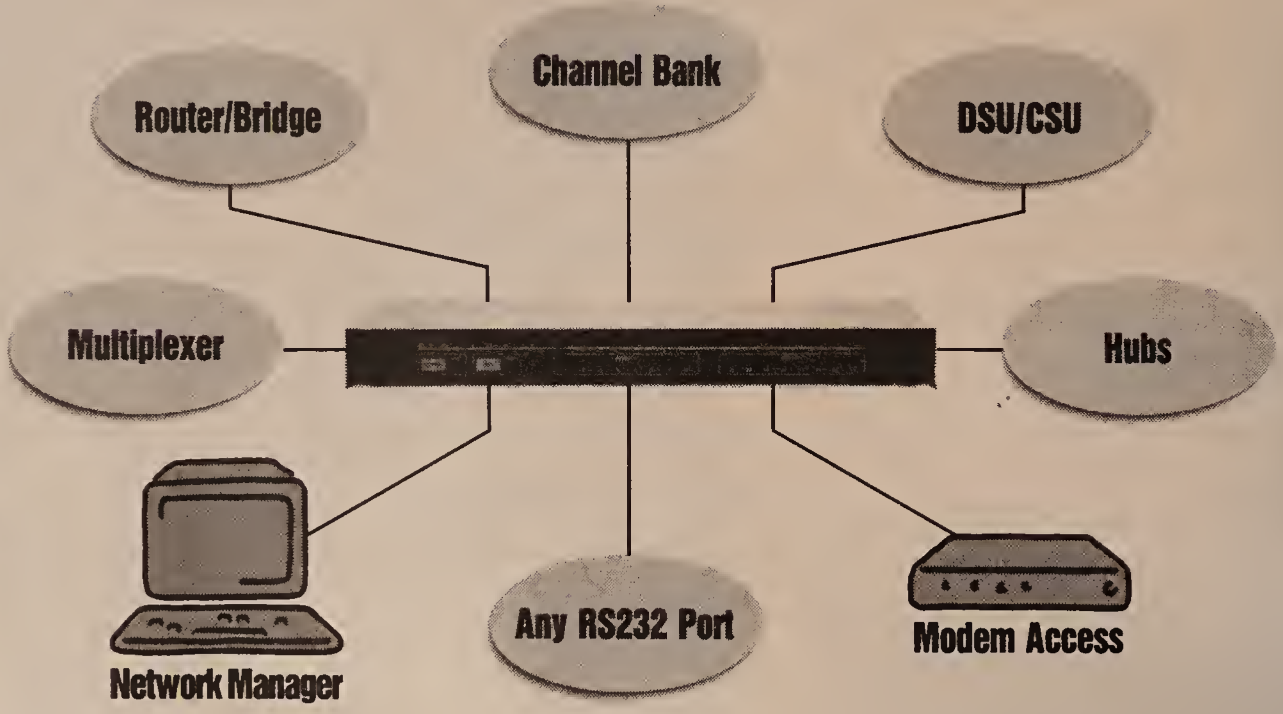

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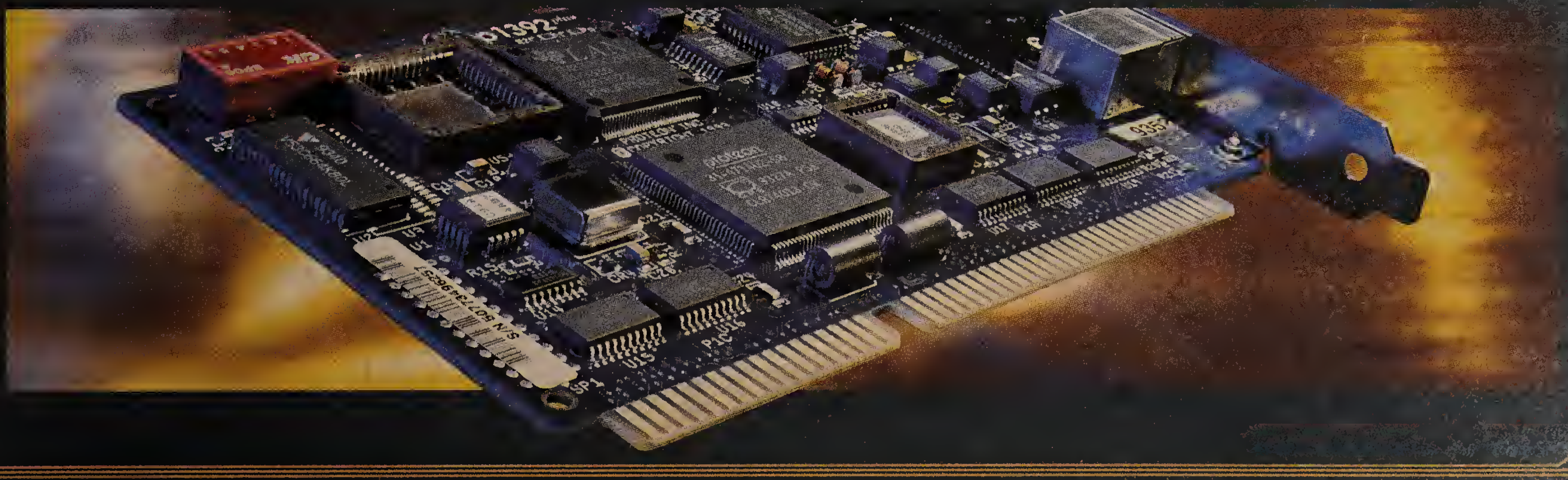

Circle Reader Service #7

Alphatronix to introduce NetWare storage system

BY CARYN GILLOOLY

Research Triangle Park, N.C.

Alphatronix, Inc. this week is expected to bring out a hierarchical storage management (HSM) product designed to ease the backup burdens of Novell, Inc. NetWare 4 users.

Inspire Migrator is a set of two NetWare Loadable Modules (NLM) that use the file migration capabilities of NetWare 4 to automatically shift lesser used files off the server hard drive onto secondary storage media, such as optical drives or tape libraries.

HSM systems work by moving files from servers to other storage media according to a list of criteria specified by the administrator. For example, an HSM system could offer three storage stages: Often-used files would remain on the hard drive, files used about once a month would be automatically moved to an optical disk, and files used less often would be sent to a tape drive.

Unlike other storage options, such as keeping little-used files in tape libraries, an HSM system lets the administrator keep all files online and accessible to end users at any time. At the same time, HSM systems automatically manage and keep track of all stored files.

Inspire Migrator's Idecide NLM offers the administrator a variety of parameters by which to decide how files are to distributed (see graphic). The Imigrate NLM performs file movement and management functions.

These NLMs work in conjunction with the real-time data migration NLM available from Novell so that any file on a NetWare server — including Unix- and Macintosh-type files — can be shuttled to alternate storage media and managed by Inspire Migrator.

HISTORICALLY SPEAKING

HSM systems have historically been built for Unix-based systems, according to analysts, because these were the systems on which customers ran their most storage-intensive applications.

"PC LANs were generally put in for electronic mail and print services," according to Michael Peterson, president of Peripheral Strategies, Inc., a research and consulting firm in Santa Barbara, Calif., specializing in storage management. "Most critical corporate data was put on Unix machines and mid-range computers."

But storage needs are changing as more customers move data-intensive, business-critical applications onto larger, enterprise local-area networks.

Inspiring use of HSM

Inspire Migrator lets administrators move files from servers to other storage media based on:

- Archive status
- Date/time last accessed
- Free space on drive
- File location
- Ownership
- Size

Administrators can also choose never to migrate specific files and to migrate files manually.

"Now, administrators in a PC LAN environment with 15 or 20 servers are going crazy. They're desperate for storage automation," Peterson said.

Although two other companies have already announced HSM systems for NetWare, Alphatronix is the first vendor to move from providing Unix-based systems to NetWare-based systems.

"This symbolizes the beginning of the maturation of the Novell-HSM market," said Dan Friedlander, an independent storage management consultant — and founder of two storage companies — in Boulder, Colo.

Peterson also pointed out potential cost savings of implementing an HSM system within either a PC LAN or a Unix environment.

"We're living with a myth where people think that after you run out of disk space you just buy more," he said. "Disk space works out to be about $1 a megabyte.

"But, on the other hand, the cost of managing storage is about $7.70 per megabyte," Peterson continued. "That's the hidden cost few people are aware of."

Alphatronix may have a leg up on its NetWare-specific competitors in that it will likely be able to bring a product to market much sooner that can work on both Unix and NetWare servers.

Steve Beer, product marketing manager at Alphatronix, based here, said a version of Inspire Migrator for Microsoft Corp. Windows NT environments is under development, as well.

Inspire Manager will begin shipping in June. Pricing will start at about $10,000.

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Microsoft, Novell talk up DCE but tend own agendas

Neither company is ready to give full backing.

BY DAVID CHAPPELL

It's too soon to declare it a shoo-in, but the Distributed Computing Environment (DCE) looks more and more likely to win a place in the network world.

Its ultimate success, however, may depend on two large players, Novell, Inc. and Microsoft Corp., both of which have vocalized support for DCE while busily tending to their own agendas.

Originally created by the Open Software Foundation, Inc. (OSF), DCE has been strongly promoted by IBM, Digital Equipment Corp. and Hewlett-Packard Co. — the OSF's original sponsors.

Many other vendors, especially those in the Unix market, jumped in early and have been shipping DCE for some time. Even Sun Microsystems, Inc., whose domination of the Unix market was one of the original motivations for creating the OSF, sells DCE.

But in the onrushing world of client/server computing, Unix is largely relegated to servers. A majority of the clients run some version of Windows.

How the DCE backing stacks up

Novell

- Funding DCE-related R&D at universities.
- Working with third parties to create gateways between NetWare and DCE.
- Ultimately will provide direct support for DCE services.

Microsoft

- Already supports DCE-compatible RPC in Windows and Windows NT.
- RPC implementation in Daytona release of Windows NT will gain authenticated calls, but no DCE-compliant authentication mechanism will be provided.
- RPC in Chicago release of Windows will be upgraded to match the Daytona RPC.
- Will add support for a DCE-compatible Kerberos client and a gateway In Cario release of Windows NT, allowing clients to access DCE CDS.

And even on servers, Unix is not without competitors. Chief among those are Novell's NetWare and Microsoft's Windows NT. Since the whole point of DCE is to provide a fundamental infrastructure for client/server computing, its availability on Windows, Windows NT and NetWare is critical.

NOVELL AND DCE

DCE was first available on Unix, and Novell owns one of the most important versions of Unix: Unix System V. Acquired via the purchase of Unix System Laboratories, Inc. (USL), System V is currently in Release 4 and is commonly referred to as SVR4.

Although the OSF was formed in large part to create a new version of Unix — known as OSF/1 — to counter SVR4, USL nevertheless played a large role in making DCE widely available. Working with the German firm Siemens Nixdorf, USL produced a port of DCE that was made available to licensees of SVR4.

Since its purchase by Novell, USL — now known as Unix Systems Group — has removed itself from this DCE porting effort.

"Novell has many things on its plate, and this was not the most profitable," said Bill Mason, Novell's manager of strategic marketing.

For now, Siemens Nixdorf will continue to sell a generic SVR4 port of DCE, while Novell will concentrate on a DCE product specific to UnixWare, its SVR4-based product.

The second and arguably more important aspect of Novell and DCE is the firm's plan for NetWare. While its long-term strategy is to merge SVR4 and NetWare over a common microkernel, this convergence remains several years in the future. For now, Novell is doing several NetWare-related things with DCE.

First and foremost, funding DCE-related research and development at universities. Carnegie Mellon University is working on a gateway between NetWare's remote file access service and DCE's Distributed File Service, while the University of Michigan might be going the other way, from DCE clients to NetWare services.

Novell is also working with a commercial third party to create a gateway between NetWare and DCE. Hosted on UnixWare, the gateway is intended to help independent software vendors develop applications that run over both DCE and NetWare.

Ultimately, Novell intends to provide direct support for DCE services, including Cell Directory Service and security, as native NetWare applications (known as NetWare Loadable Modules). Mason said we can expect to see this sometime in late 1995 or early 1996.

"Novell firmly stands behind the principles and goals of DCE," according to Mason. Asked if Novell would use source code licensed from the OSF in NetWare DCE products, however, Mason stated flatly: "I don't think it will ever happen."

Instead, Novell plans to implement DCE independently, based on the publicly available specifications published by the OSF and X/Open Company, Ltd. In fact, when asked why Novell recently became a sponsoring member of the OSF, Mason said, "Our customers asked us to." But he added that Novell hopes "to get the OSF back on track."

To Novell, this means that the OSF should emphasize its function of developing common specifications and get out of the business of producing source code. "We're not trying to tank the effort," Mason said. "But conformance to specs is sufficient."

In this world, the OSF and X/Open would be specifiers and conformance police, not creators of software.

MICROSOFT AND DCE

Like Novell, Microsoft has two possible homes for some or all of DCE: Windows NT and Windows.

According to Mark Ryland, senior program manager in the Windows NT group, "DCE is not the main technical direction for Microsoft in the area of distributed computing, but it is an important interoperability standard that we'll support more and more over time."

Evidence for this is the DCE-compatible remote procedure call mechanism included in the current version of Windows NT. Windows NT's next release, currently known as Daytona, will round out the RPC implementation and add the ability to support authenticated calls — although no DCE-compliant authentication mechanism will be provided.

In Windows NT's Cairo release, due sometime next year, Microsoft will add support for a DCE-compatible Kerberos client and a gateway allowing clients to access DCE's Cell Directory Service.

"If we have RPC, security and naming services in the NT shrink-wrapped box, that's all that matters," Ryland said.

Digital has announced a full implementation of DCE for Windows NT, and, according to Ryland, Microsoft will continue to encourage customers that need all of DCE to buy it from third parties.

Microsoft also plans to increase support for DCE technologies in the basic Windows package. A DCE-compatible RPC is available now for the current version of Windows, while the product's forthcoming Chicago release, Windows 4.0, will upgrade this RPC to include the same DCE technologies as Daytona.

And at approximately the same time that Cairo becomes available, the DCE technologies it includes will also appear in Windows. But again, those requiring full DCE services on Windows should look to third parties.

Microsoft's direction for distributed computing involves Object Linking and Embedding (OLE), and DCE plays an important role.

Indeed, the distributed version of OLE runs on top of the DCE-compliant RPC implementation in Windows and Windows NT, and the language used to define interfaces to OLE objects is an extension of DCE's Interface Definition Language.

"The pieces of DCE that we're building are exactly those that we need to support distributed objects on heterogeneous platforms," Ryland said.

Like Novell, Microsoft has implemented and intends to go on implementing DCE on its own. No OSF-licensed source code is used in Microsoft products, so no royalties are owed. To ensure compatibility with other DCE-based products, Microsoft has licensed the OSF's DCE test suite and verifies interoperability with other vendors' products during development.

CONCLUSIONS

No matter what they say, vendors hate open systems. They always have and they always will. And since vendors are ultimately responsible to their stockholders, they should hate open systems — they're the enemy of high-profit margins.

And yet despite this basic truth, DCE is spreading. Support from Novell and Microsoft, two giants in the software world, can only help.

But how serious is this support?

In the case of Microsoft, the company is treading a middle ground between full-throated endorsement of DCE and complete reliance on proprietary solutions. For those parts of DCE it implements, Microsoft seems committed to ensuring interoperability and a high degree of portability. Distributed OLE's reliance on a DCE-compatible RPC provides further evidence of its place in the company's long-term strategy.

Novell's approach to DCE, on the other hand, is more tentative. Given its current dominance in the local net market, it arguably has more to lose by moving to the vendor-neutral strategy implied by DCE.

"We're a for-profit company," said Novell's Mason; a truth that users would do well to keep in mind for all of their suppliers.

Promising DCE implementations in the future is an excellent way of putting off a decision. Until it becomes obvious DCE cannot be ignored — if ever — count on Novell to make soothing noises about DCE, then sell as many units of its current products as possible.

➻ Chappell is principal of Chappell & Associates, a training and consulting firm in Minneapolis focused on distributed computing.

Summarizing DCE's goal

Client/server applications need supporting services in order to carry out their functions. While it is possible and not uncommon for each application to come bundled with all of the services it needs, this approach is not efficient. A better solution is to provide a core set of common services, then build each distributed application on top of this framework.

The Distributed Computing Environment's (DCE) goal is to provide that framework.

The services that DCE provides for client/server applications include:

- **Remote procedure calls (RPC) for clients and servers to communicate.**
- **A programming interface for multithreading, allowing a client to issue an RPC, then perform another task without waiting until the remote call returns. Similarly, a multithreaded server can handle requests from multiple clients at the same time.**
- **A directory service, providing a convenient way for clients to locate servers. The primary directory used by DCE is the Cell Directory Service.**
- **A security service, allowing clients and servers to certify one another's identity and, if desired, to protect communications between them. This service is based on Kerberos and relies on the presence of a security server.**
- **A time service, ensuring that the communicating machines' clocks are synchronized.**

All of these services are available for use by DCE-based distributed applications. And although it is really an optional application rather than part of the basic DCE infrastructure, DCE also includes the Distributed File Service (DFS). DFS provides a Unix-oriented file-sharing system based on the core DCE services described above.

Along with an emerging set of specifications, the Open Software Foundation, Inc. (OSF) provides an actual implementation of DCE. Most vendors currently shipping DCE products have built those products around code licensed from the OSF, with royalties paid by those vendors providing part of the funding required to keep the OSF afloat.

BY DAVID CHAPPELL

Internet

Continued from page L1

Geoff Mulligan, Internet engineer at Sun Microsystems, Inc., describes fire walls as a perimeter defense, a hard shell around a soft center, "like a Cadbury Egg." If a hacker compromises the fire wall, then the entire internal network is at risk. The idea is similar to locking the door but stopping short of bolting the furniture to the floor.

As a practical matter, the furniture can't be bolted to the floor. Likewise, securing all the company's Windows-based systems and Macintoshes would be next to impossible, said David Mitchell, an analyst at Aldus Corp.

Mitchell relies on InterLock, a fire wall product from ANS CO+RE Systems, Inc. to protect its network.

Like Costa, the fire wall has given Mitchell confidence in using its connection, and now Aldus is starting to look at serving customers over the Internet.

NO SETUP.EXE

Fire walls are not shrink-wrapped products. They require a fair amount of planning and customization. Fortunately, the number of resources required to do so are also growing.

The book *Fire Walls and Internet Security, Repelling the Wily Hacker,* written by William Cheswick and Steven Bellovin and published this month, is the first mainstream how-to manual about fire walls.

It contains a wealth of information, and anyone managing an Internet connection should get a copy. However, before diving into the details, Cheswick and Bellovin point out that a fire wall only implements a security policy and that the policy must come first.

Establishing a policy can be a bit overwhelming, especially since most users are new to the Internet and are unaware of the large number of threats that exist. But Cheswick and Bellovin's book is a good place to start. There are also consultants that will help establish an Internet security policy. Trusted Information Systems, Inc. (TIS) is one such firm that offers a fire wall product.

According to Fred Avolio, principal analyst at TIS, the first step in a policy is a security survey. The survey should include standard questionnaires as well as interviews with key client personnel. Within two to three weeks, the results are presented to the client. The next step is to create a written policy based on the survey results and client feedback.

Bill Morgan, senior net consultant at Dun & Bradstreet Information Services (DBIS), said TIS "brought up a whole lot that I hadn't thought or known about." Morgan involved TIS during the planning of DBIS' Internet connection and is using its fire wall product.

DBIS is currently using its Internet connection as a resource for its application developers. The next step being explored, according to Morgan, is to offer its on-line services over the Internet.

Another source of fire wall expertise can be found within some Internet access providers.

A new start-up, Pilot Network Services, Inc. of Alameda, Calif., is focused on customers that want more than just a pipe to the Internet. Pilot, a member of the Commercial Internet Exchange, will implement complete fire walls for its customers and maintain them, according to Tom Wadlow, Pilot's director of engineering.

NOT $49.95

The cost of a fire wall can exceed the cost of the Internet service and must be accounted for in the early planning stages. If it isn't, budget-conscious customers can be in for some sticker shock.

The initial cost of fire wall hardware and software can be $20,000 to $30,000, or even $60,000 on the high end. Recurring maintenance costs can be around $10,000 a year. The access providers that offer fire wall services may bundle the cost with the price of Internet access, which makes comparisons difficult.

Surprisingly, once a fire wall is set up, it does not require much attention. Both Costa and Mitchell estimated that only four to six man-hours a week are devoted to it. According to Costa, this time is spent in administration and reviewing the fire wall activity logs.

If the fire wall is limited to packet screening, the cost can be reduced to the cost of a router. Most routers have packet-screening software built-in, but not all packet-screening software is equal. Mulligan said users need to be wary of routers that screen only on outbound interfaces, byte values and offsets, instead of explicit protocol fields, and routers that reorder the screening rules.

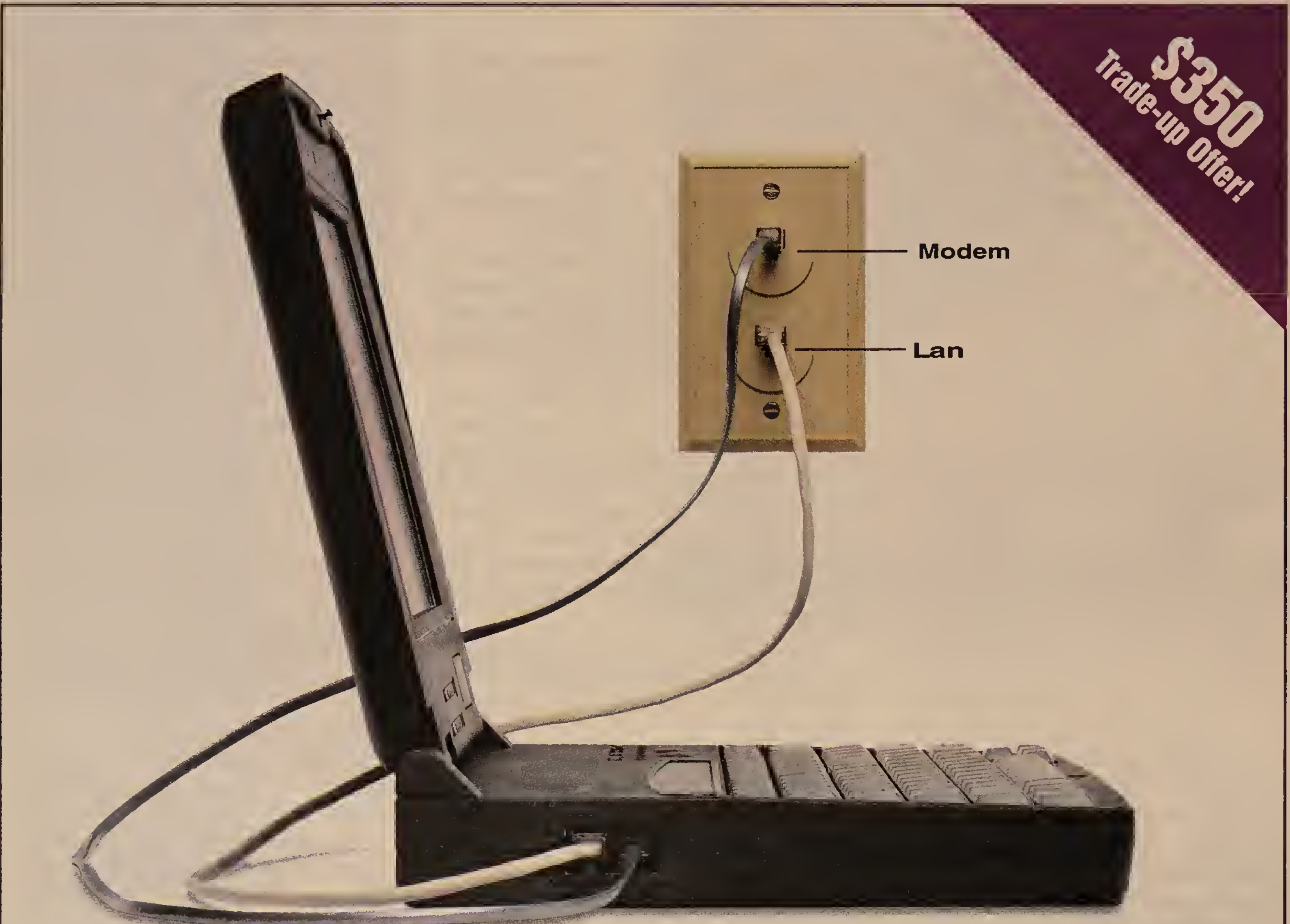
ROLL YOUR OWN

Morgan points out that a big advantage of using a commercial fire wall product is that the code is tried-and-true. It's been tested and debugged across many different environments.

But for some Internet customers, expense or product limitations may prohibit them from using a commercial product. Not to worry, there are many freely available resources on the Internet.

A good place to start is the fire walls Frequently Asked Questions (FAQ), which can be

See **Internet,** *page L12*



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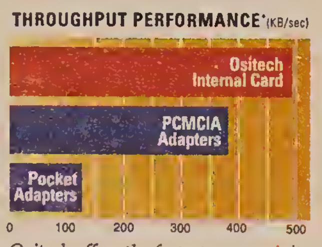

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Getting a management handle on virtual LAN infrastructures

The flexible network fabrics make LANs easier to administer but often change the rules of the game.

BY JOHN McCONNELL

It's one thing to create virtual LAN infrastructures using a hierarchy of switching elements that extends from port switching on up through ATM cell switching (*NW,* May 2, page L18). Trying to manage these flexible and fluid structures is another.

Being able to move easily between logical and physical representations of the virtual network is one of the keys. Administrators need simple, intuitive tools that simplify creation, modification and management of workgroups.

Vendors are converging on similar schemes. "Iconized" representations of logical workgroups will be used for high-level abstract views, letting administrators use drag-and-drop operations within a graphical interface to move individual users or groups of users between different virtual workgroups.

Lower level representations will provide physical topology information, showing the attachments of nodes to local-area networks or switches, as well as connectivity between switching elements.

Administrators will monitor virtual workgroups using a window that contains icons representing each member as well as icons for shared resources such as servers. Changes in color or shape will be used to provide an indication of the current status of each element.

These views will be more useful than the traditional views based on physical topology. For instance, administrators will no longer need to search through physical maps to locate members of a distributed, virtual workgroup.

Although none of the vendors are providing all of the tools needed to manage virtual workgroups in this manner, some let you cut and paste elements from topological maps to create views of certain network components, such as all the servers in a campus environment.

Hewlett-Packard Co.'s Operation Center, an OpenView application for managing systems, supports some of this logical grouping, for example. But it only provides for management of physically attached Unix systems; there is no virtualization involved.

Other platforms, such as IBM's NetView/6000, Cabletron Systems, Inc.'s Spectrum and NetLabs' DIMONS, allow administrators to build views of logical groups today, but again, it involves cutting and pasting from topology maps rather than using some sort of management software tool to define the virtual workgroup.

ADDS, MOVES AND CHANGES

The virtual infrastructure makes it possible to easily change connectivity (and membership in virtual workgroups) as new teams are formed to exploit emerging opportunities. And while it will be possible to actually reconfigure workgroups by simply using drag-and-drop commands, there are many other steps that have to be automated.

Cabletron and Newbridge Networks, Inc., for instance, are adopting a strategy of proactive registration to simplify physical moves. When a node is connected to a switch port, the connection management system — which goes by different names in various vendor implementations — and other parts of the virtual management infrastructure are notified.

The new end node is marked and identified by its membership in a predefined logical group, and the appropriate connection management tables are automatically altered to reflect its new location. In this way, the privileges and rights of the users move with them wherever they are attached to the virtual infrastructure.

Other functions happening behind the scenes of a drag-and-drop operation include communicating to the connection management system information about new access and security policies and resources available to affected users.

Automating the changes in workgroup membership also involves transferring personal files to the new workgroup server and obtaining a new complement of software applications. Early management tools will need to remind operators to take care of some of these other functions until they are fully automated.

Traditional LANs will still be the major elements of the virtual infrastructure for at least another decade. Moves between traditional LANs will still be achieved through port and module switching within intelligent hubs. Although this type of switching does not add more bandwidth, it is still important for load balancing and for attaching members of the same virtual workgroup to a shared LAN segment.

Systems may be moved across router boundaries, which entails the modification of appropriate Internet Protocol addresses, sub-

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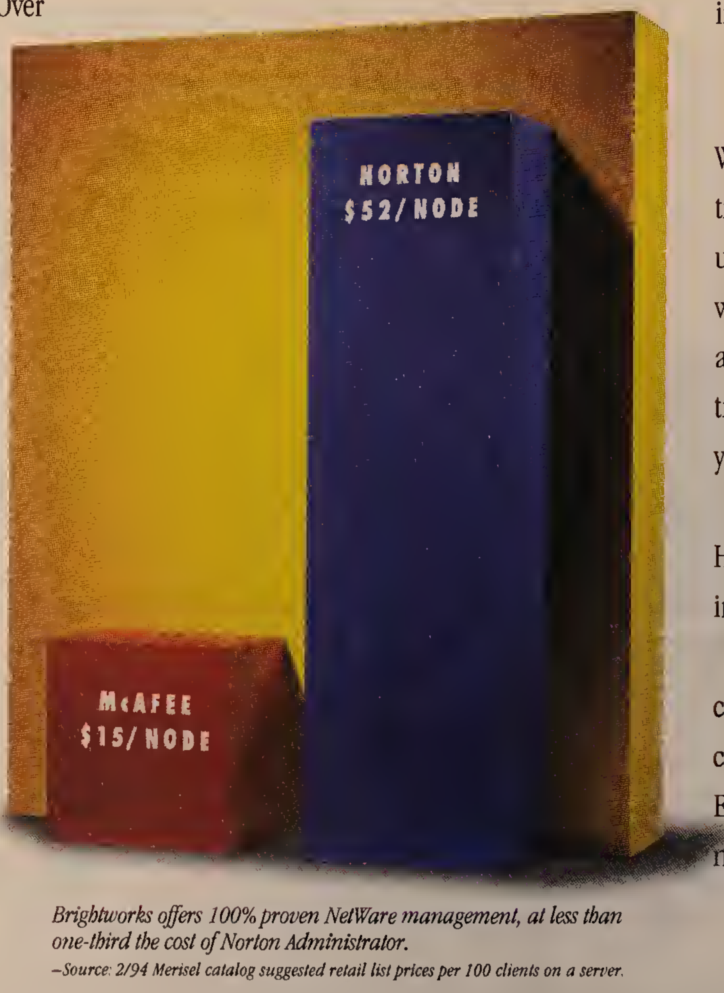

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Circle Reader Service #3

network masks and directory server entries. These functions may also be automated in the future, particularly with dynamic IP address assignment. However, in the interim, administrators must be reminded or have other custom procedures built to handle these situations.

POLICY-BASED MANAGEMENT

The virtual infrastructure offers administrators opportunities to manage their environments from a policy perspective rather than from a device management point of view. Administrators describe rules and constraints that the virtual environment implements into policies.

For example, administrators can set rules about the number of active connections permitted based on the time of day or may assign bandwidth based on applications needed. Based on these rules, the connection management system will then set policy by configuring the switch ports, assigning bandwidth, checking for the number of allowed connections and so forth.

The connection management system also carries out routing policies when it selects paths. Particular paths are selected based on application-specific parameters, bandwidth requirements or routing requirements to keep secure traffic separate from other traffic within the environment.

More sophisticated policies will develop with ongoing experience and as management processing elements, such as remote monitoring probes and embedded processors, grow more powerful.

Network administrators must be able to easily describe, review and modify policies. Graphical user interfaces (GUI) allow administrators to view rules, select operators (such as "Exceeded By" or "Unchanged") and apply them to icons. Initial descriptions are expected to be relatively straightforward, with further releases providing the ability to specify and modify more complex rules.

It will also be important to apply policies to groups of resources, such as servers or members of a team; membership automatically associates the appropriate policies.

Administrators will also have to build other types of integrity constraints into the management system. For example, LAN managers should be constrained from changing memberships of secured virtual workgroups without specific authorization or moving critical servers during regular work hours.

MONITORING THE WORKGROUP

Network monitoring takes on a different meaning when you're talking about virtual workgroups. There is no single physical point where monitoring equipment can be attached. Furthermore, the virtual workgroup will have nodes in many locations and on networks supporting speeds ranging from traditional 10M to 155M bit/sec.

Monitoring components, at least Remote Monitoring-based probes, must be embedded in the switching elements. Probes on the switches can be programmed to collect statistics from any specified port under direction of the management system. Port-level statistics will be available from the switches providing customary statistics on traffic volumes, error rates, addresses used and other necessary management information.

Some vendors are providing additional capabilities to make portable monitoring simpler. For example, Newbridge Networks sends captured traffic from any of the ports on its Ridge LAN switch across the ATM backbone to a central management site where it can be analyzed in further detail. Other vendors are considering adding extra ports to their switches that can be used to copy traffic from a selected port for more detailed analysis.

In the future, monitor probes will incorporate substantial processing power and provide local analysis, data reduction and compression to reduce traffic volume and faster responses to conditions.

A full view of the behavior of a virtual workgroup is built out of information gathered from different parts of the virtual infrastructure. Monitoring applications will be closely integrated with the Connection Management System, extracting the necessary information to build virtual work group activity views. Port statistics on each switching element and the flows between virtual work group members across the switched ATM backbone must be integrated into a coherent view.

A common window for a virtual workgroup will likely be used to show traffic flow and volume between members. Administrators will need to set thresholds on traffic volumes or on members to detect potential problems. Traditional monitoring and measuring capabilities, such as building baselines and activity profiles, will also be useful to network administrators in the new environment.

One of the unanswered questions is the determination of simple and appropriate metrics to describe virtual workgroup activity. A traditional LAN workgroup is characterized by simple metrics, such as utilization levels, numbers of collisions and packet rates. The emerging virtual workgroup will not be so easily characterized. None of the vendors interviewed for this article have yet determined the appropriate metrics to describe workgroup behavior.

A key complement to adequate monitoring is the delivery of traffic analysis. Administrators need to understand the traffic flows between members of a workgroup as well as the relationship between the logical flows and the physical infrastructure supporting them.

Initially, traffic analysis will be restricted to informative displays and presentations of the collected information, allowing administrators more insight into the behavior of their virtual environments. However, automated analysis that provides suggestions for placement of switching elements, partitioning of traditional LAN segments, and other means of optimizing and improving the behavior and performance are not expected for at least a year. These complex tools will require substantial processing power and sophistication algorithms to provide more assistance to administrators.

The virtual environment adds new management challenges. The greater volume of information and the relationships between physical/logical connectivity, access control policies, path selection, inventory, software distribution and other functions will strain current tools. The emerging tools will be able to deliver more effective applications in time.

➡ McConnell is president of McConnell Consulting, Inc. in Boulder, Colo.

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Artisoft combines NetWare, LANtastic

BY CHRISTINE BURNS

Tucson, Ariz.

Artisoft, Inc. last week released a dedicated server network operating system that gives LANtastic peer-to-peer users faster network services and strong ties to Novell, Inc. NetWare enterprise systems.

CorStream is a 32-bit multitasking NetWare Loadable Module combining LANtastic software with a run-time version of NetWare 4.01. CorStream supports LANtastic 5.X and 6.X clients, which treat the server as if it were another peer node on the network.

CorStream is the result of a licensing agreement signed earlier this year under which Artisoft purchased Novell's server technology (*NW*, Feb. 21, page 21).

Sunil Padiyar, vice president of product development at Artisoft, said CorStream combines LANtastic's ease of use with NetWare's performance.

"NetWare 4.X offers users the best network operating system in the industry, but you have to be a Novell Certified Network Engineer to run it," Padiyar said. "CorStream doesn't require any additional training for administrators already running LANtastic."

Ren Roderick, an information systems engineer at Interpoint Corp., an electronic component manufacturer in Redmond, Wash., said he is looking at CorStream for increased speed, compared with the existing 16-bit performance of LANtastic. Interpoint has a 180-node LANtastic 6.0. network.

Roderick is running CorStream on a test server to see if it can perform better than the four LANtastic workstations he has dedicated as network servers.

"While those [LANtastic] workstations are doing the job in terms of moving the data along the network, they weren't designed to be dedicated servers, and their lack of speed reflects that," Roderick said.

Pricing for CorStream, expected to begin shipping in June, starts at $949 and will ship in 5-, 10-, 25-, 50- and 100-user kits.

☎Artisoft: (602) 670-7100.

Internet

Continued from page L8

found by anonymous FTP on ftp.tis.com as /pub/firewalls/firewalls-FAQ. This document answers basic questions and points to other resources and publicly available software. It also describes how to subscribe to the fire walls Internet mailing list, which is managed by fire wall consultant Brent Chapman of Great Circle Associates.

For environments where the furniture must be bolted to the floor, there is also help. There are a number of auditing software packages available on the Internet that will probe a network and report potential vulnerabilities. One commercial package is Pingware from Bell Communications Research.

According to Richard Asmuth, a member of Bellcore's technical staff, Pingware runs in the background and will probe every host on a given network that is looking for weaknesses. Pingware produces concise reports on the state of the network for the net administrator.

FIRE WALL TO FIRE WALL

Besides protecting the Internet user from intruders, fire walls can be constructed for private communication over the Internet between sites. This can eliminate the cost of dedicated or dial-up bandwidth between sites.

According to Mulligan, this works by configuring the fire walls so that Internet Protocol packets between two sites are automatically encrypted. The sending fire wall encrypts the entire IP packet, encapsulates it inside another packet, then sends it to the fire wall at the other site.

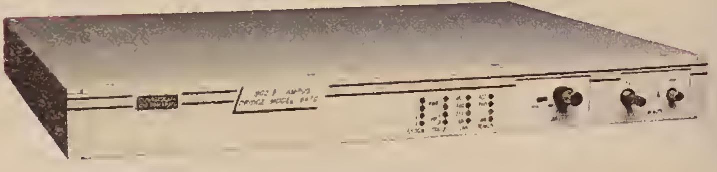
The receiving fire wall extracts the encapsulated IP packet, decrypts it and releases it on the remote network. An observer on the Internet will only see encrypted data between the two fire walls. All other details about the data and its real protocol headers are hidden by the encryption.

This is a relatively new fire wall application, and there is no standard protocol yet for encryption and encapsulation. The ANS InterLock product supports encryption between two InterLock fire walls.

Routers by Morning Star Technologies, Inc. also have "selective gateway encryption," according to Steve Neruda, a support engineer at the company.

The Internet keeps growing at an astounding rate, and the small community it once was is a distant memory. In spite of this, companies are discovering that they can manage the risk of connecting to the Internet, and they are doing it with fire walls.

◆Jensen is president of Nomadix, Inc. of Pleasanton, Calif. He can be reached at (510) 225-1000 or ehjpsilink.com.



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NET RESULTS

by Mark Gibbs

NetWare Connect Services: nice idea, few facts

Over a year ago, when Novell, Inc. announced the NetWare Registry (*NW,* April 19, 1993, page 13), it wasn't obvious what the company was up to. Just why would anyone want to lay down several hundred dollars to register an Internetwork Packet Exchange (IPX) address and/or a name?

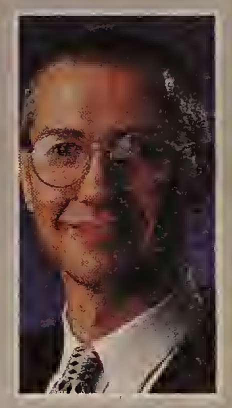
Novell positioned the registry as a way to eliminate addressing conflicts for companies linking their NetWare local-area networks with those of trading partners.

However, since there was no easy way to link NetWare LANs, the need for such unique addressing and for such a registry was somewhat puzzling.

Even if the Internet was used to make the link between NetWare LANs, IPX addressing wouldn't be an issue (and on the Internet, Internet Protocol addresses and domain names are free).

But a few months ago, the idea of the registry started to become more clear. Rumors started circulating that Novell was doing some kind of deal with AT&T to create a new national business network for IPX traffic. And at the recent NetWorld+Interop 94 show in Las Vegas, Novell and AT&T announced AT&T NetWare Connect Services (NCS), the subject of those rumors (*NW,* May 9, page 1).

Novell and AT&T basically will offer a smart net infrastructure based on NetWare 4.X's NetWare Directory Services (NDS). You might think of NDS as taking the place of the Internet's Domain Name Service (DNS).



The communications fabric will be based on AT&T's InterSpan frame relay service and 14.4K bit/sec dial-up lines. It will support IPX and IP traffic.

The use of NDS to manage this environment will not, as Novell's director of marketing Bernard Harguindeguy told me, exclude NetWare 3.X systems from tying into the service. But what all NetWare systems will be required to use is the yet-to-be-released NetWare Link Services Protocol (NLSP), part of Novell's next MultiProtocol Router offering.

NLSP is Novell's solution to problems caused by the use of IPX routing services and Novell's Service Advertising Protocol when used in wide-area network environments. Without NLSP, the WAN would be flooded with traffic from servers passing routing information and messages containing the digital equivalent of, "Here I am!"

What's the price of NCS? While "affordable and comparable to Internet connection charges" is all Novell and AT&T are saying, I expect that it will be a premium service.

Where the whole proposal gets most vague, however, is in the NDS stuff. For example, NDS handling IP naming is an interesting idea, but there's no concrete information yet about how this will be done.

There is also the much bigger question of using NetWare 4.X in this extended environment. One of users' big complaints concerning 4.X is its lack of tools for manipulating the NDS tree.

In the NCS environment, how will we interact with another company's NDS tree?

Even more importantly, how will a company's NDS tree interact with the overall NCS directory tree?

Currently, these are the kinds of details missing from the AT&T-Novell plan, and it is exactly these missing details that weaken the concept. NDS is a superb system with rough edges; using it as the basis for NCS takes the directory service into a whole new dimension.

Novell needs to address the 4.X issues and the implications of NCS in much greater detail as soon as possible so that strategic planners can start making decisions. The most important issues have to do with AT&T NCS becoming nationally available and with network security — an issue that has kept some companies off of the Internet.

What we have here is potentially the Information Superhighway for NetWare LANs. Congratulations. Nice idea. Now, when can I get connected?

➡ Gibbs is a consultant and writer based in Ventura, Calif. He can be reached at (800) 622-1108, Ext. 504, or on the Internet at mgibbs@rain.org.

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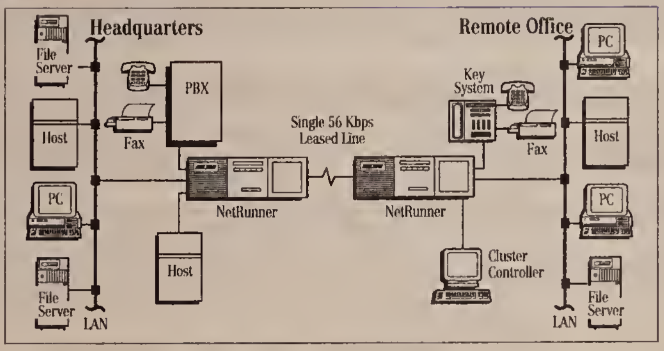

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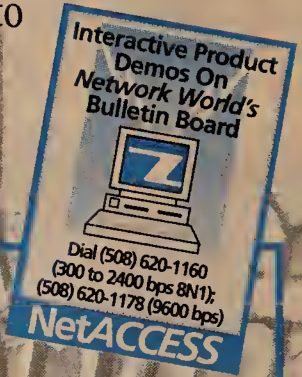
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New products featured in blue.

ADC TELECOMMUNICATIONS

PatchSwitch Demo. ADC's automated control for remote tech control switching systems. Includes circuit configuration records and switching alarm history on all connections.

BARANOFF SOFTWARE

MailCheck Demo. A unique multi-vendor E-Mail management system which allows you to monitor all mail connections.

BELL ATLANTIC OF PENNSYLVANIA

Area Code Demo. Data disk lists exchange code changes after the Bell of PA (215) area code split on 1/8/94. Available in DOS and Windows.

COMMUNICATIONS DEVICES

Network Windows Demo. Requires a MS-DOS PC with 640k and color monitor.

COMPAQ

Product Line Demo.

COOPER AND ASSOCIATES

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DATAPROBE

Annunciator Demo. Communicating Annunciators monitor and report remote and local network alarm events.

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2. IRMA Workstation for Windows and OS/2.

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CD-ROM Product Information. Describes Communications, MicroData and Dataworld Infodisks.

IBM

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MCDATA CORPORATION

McData 60. LAN-to-mainframe connectivity solutions.

MICROCOM

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Embarc Demo. Embarc (SM) allows users to send letters, memos, database updates and more to MAC and DOS based portable computers in over 170 cities.

NATIONAL COMPUTER SECURITY ASSOCIATION

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NET X, INC.

LANswer. Network troubleshooting software.

NETWORK DIMENSIONS

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NETWORK MANAGERS, INC.

NMC Vision. For Windows 3.1, NT, etc.

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SOURCE-COMM CORP.

Client Server Demo. This ANS/1010 client demo dials into Source-Comm's ANS/1010 Server. Together they emulate both 5250 & 3270 for remote access to IBM mainframe and AS/400 hosts.

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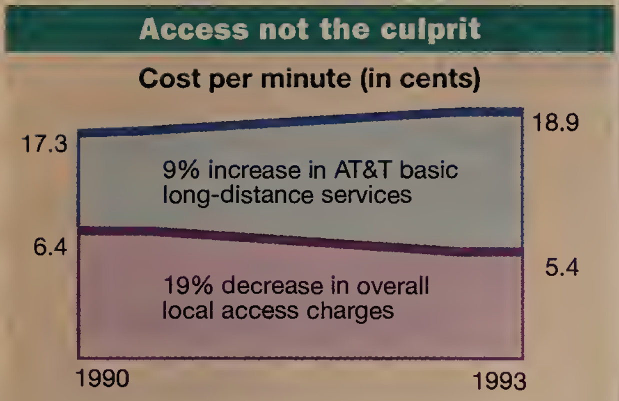
NETWORK WORLD



The IXCs often point to local access charges as a factor in their rate hikes. However, overall local access costs have steadily declined, widening IXC margins.

GRAPHIC BY TERRI MITCHELL SOURCE: MFJ TASK FORCE, WASHINGTON, D.C.

AT&T hikes long-distance pricing again

BY JOANIE WEXLER AND ERIC PAULAK

Basking Ridge, N.J.

Long-distance service prices are getting jacked up again, despite a competitive arena with many players, falling local access rates and the lowest consumer price index in years.

AT&T has increased most of its basic long-distance business services rates by 4%, the third such increase in nine months. If history is any indicator, the other major carriers will follow on AT&T's heels with comparable percentage increases of their own, according to analysts.

"You can bet MCI and Sprint are down at the FCC filing their increased tariffs as we speak," said Joe Noel, general manager of telecommunications research at IntelliQuest, Inc. in Austin, Texas.

Neither MCI Communications Corp. nor Sprint Corp. would comment as to whether they had their own plans for rate increases. However, both said they would continue to offer rates lower than AT&T's, regardless of whether they raise them.

Some said the situation could eventually drive customers to start considering resellers or second-tier carriers, such as Cable & Wireless Communications, Inc., LDDS Communications, Inc. and others — if the pricing gap sufficiently widens.

"If that margin gets great enough, the second-tier carriers could become viable for companies without enough business to warrant a contract" to stabilize prices, according to Ken Yorgensen, director of telecommunications at Baxter Healthcare Corp. in McGaw Park, Ill.

At Baxter, a Tariff 12 shop, Yorgensen said the rule of thumb is that a price gap must be at least 20% to justify looking at another supplier "because it takes a lot of time and effort to make any kind of change."

AT&T's 4% rate increase applies only to voice services and does not affect data communications or Software-Defined Network contracts, AT&T said. The move follows a 3.9% increase initiated by AT&T in August 1993 and mirrored by MCI, Sprint and MetroMedia Communications Corp., then another 3.9% increase led by MCI during this past January and subsequently mirrored by AT&T and Sprint.

The new rates affect many customers with contract tariffs, which call for a percentage discount off the tariffed rates based on volume. AT&T has about 1,600

See Pricing, *page 32*

IBM software to bridge wireless, wired network interoperability gaps

BY JOANIE WEXLER

Atlanta

IBM is expected to detail a major interoperability initiative today aimed at melding a variety of user devices with a huge "virtual" network of wireless and wired services.

IBM plans to unveil its Intelligent Communications architecture — formerly codenamed In-Touch — at the Spring/Comdex show here.

Intelligent Communications is an answer to AT&T's PersonaLink transport-independent service, slated for availability this summer, and is similar in concept to Motorola, Inc.'s faltering Mobile Networks Integration (MNI) effort. It is intended to allow users to tap the data they need independent of the access device used and where the data resides, sources said.

This network "glue," in the form of IBM-developed software, will be delivered through the Advantis net, an IBM-Sears Roebuck and Co. venture, as well as by other network operators such as Ardis, which will announce service offerings later this year, sources close to IBM said. Other partnerships are reportedly under negotiation.

IBM declined to comment on the effort.

IBM's software, which will likely not be implemented for at least a year, will run on hosts and user devices such as cellular phones, laptops, personal computers, facsimile machines, and personal digital assistants to tie them to a range of wireless and wired networks. The idea is to allow the mixing and matching of devices with networks and to deliver data in user-specified formats.

For example, a fax could be sent in hard-copy form but received in another form customized by the recipient such as a voice message. Messages reside in one integrated, media-independent "mailbox."

The customization would be done via software known generically as intelligent agents, or "actors" in IBM vernacular. Like the intelligent agents in the General Magic, Inc.-designed Telescript software base of AT&T's PersonaLink service, these actors will also find, filter and deliver information on the user's behalf.

The actors will also determine which net is most appropriate for a given transmission, based on factors such as least-cost routing and application characteristics, including degree of burstiness.

Such integration — which extends beyond messaging to many other types of applications — is a critical step if mobile computing is to take off, observers said.

"So far, the greatest level of wireless interoperability I've seen is RadioMail," said Phil Evans, director of telecommunications at systems and net outsourcing company Perot Systems, Inc., who is heavily investigating wireless services.

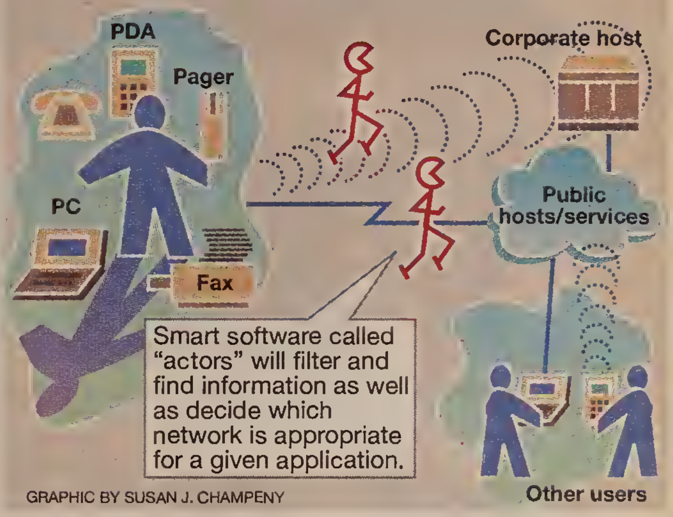
RadioMail Corp. provides a messaging application, computer/modem and gateway service package for exchanging messages over dissimilar nets, such as the Ardis and RAM Mobile Data wireless networks and wired Internet and CompuServe, Inc. nets.

"What has piqued my imagination most is the MNI effort, whereby disparate systems can talk to each other through a hardware/software combination," Evans said.

But MNI seems to have faded; the first quarter of this year came and went without the MNI product announcements targeted for that time frame by Motorola last year.

IBM's Intelligent Communications

Users will have their choice of access devices for tapping a virtual wired/wireless net of corporate and public hosts.


PDA
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PC
Fax
Corporate host
Public hosts/services
Smart software called "actors" will filter and find information as well as decide which network is appropriate for a given application.
Other users

GRAPHIC BY SUSAN J. CHAMPENY

"There is a real need for this kind of gateway technology," said Roberta Wiggins, program director of wireless technologies for The Yankee Group, a Boston-based consultancy. "Middleware such as this is the fifth critical component in mobile computing" after hardware, application software, operating systems and a communications infrastructure, she said. ☒

BRIEFS

A **mobile communications** package that will ship on all **IBM ThinkPad** portable computers as of June 30 and link to the **Advantis** worldwide network will let users of **Lotus Development Corp.'s** cc:Mail exchange messages with users in more than 90 countries. IBM, Lotus and Advantis said last week that they have collaborated on cc:Mail for Advantis — formerly codenamed Rover — and that the IBM Mail Exchange will translate messages among Advantis and other nets.

Advantis: (800) 438-2763.

Telepartner International has signed an agreement with **The Dun & Bradstreet Corp.** and **RAM Mobile Data** to develop and market a mobile communications service in the U.K. The service, slated for availability in June, will provide subscribers with access to on-line databases containing pharmaceutical industry data. Sales representatives from major drug companies can use this service to reduce the time it takes to process customer orders by gaining immediate access to sales activity reports and information on their customers.

Telepartner: (800) 935-3270.

Sprint Corp. last week introduced SprintFAX OnLine, software that marries Sprint's existing SprintFAX service to Windows. Customers who send facsimiles from their personal computers and subscribe to SprintFAX — a service for managing and broadcasting faxes — can add that function as another icon on their Windows desktops.

Sprint: (800) 366-0707

During a Senate Commerce, Science and Transportation Committee hearing, the chiefs of **MCI Communications Corp.** and **Bell Atlantic Corp.** went head-to-head on the topic of local exchange carriers entering the long-distance market.

MCI Chairman Bert Roberts asserted that since the regulated local Bell companies have "a history of monopoly abuse," they should not be allowed into the long-distance arena until there is effective competition in the local exchange. Bell Atlantic President James Cullen countered that the Bells should be allowed into long distance at the same time their local markets are being opened and that keeping them out of long-distance limits choices for buyers.

The U.K.'s **Cable & Wireless, Ltd.** has launched a global managed communications service aimed at the world's top 2,500 multinational corporations.

The carrier will offer a seamless service, with all billing, contracts and service management coordinated through a single point, said James Ross, Cable & Wireless chief executive.

The effort is similar to those rolling out from other carriers, such as AT&T. In July, AT&T will begin its WorldSource service, which will integrate all aspects of AT&T Software-Defined Networks in different countries, starting in the U.S. and Canada.

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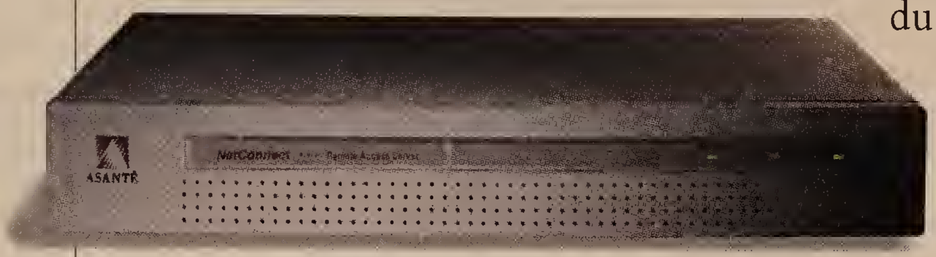

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Circle Reader Service #11

Whither the VANs?

Providers move up value chain with E-mail enhancements.

BY BILL BURCH

Washington, D.C.

With their traditional base of X.25, electronic mail and electronic data interchange services now mature, value-added network (VAN) providers are polishing up those offerings with new technology such as multimedia and object-oriented messaging platforms.

Beyond those improvements, the VANs hope to enter new markets by targeting services with greater potential for added value, an approach typified by AT&T's alliances with Novell, Inc. and Lotus Development Corp. for NetWare and Notes applications, respectively.

With its plan for NetWare services for users, AT&T has gone the farthest to date with the idea of tying together user applications and carrier services, said Kitty Weldon, a data communications analyst with The Yankee Group in Boston. "They've decided who the market leaders are, and they have explicit support all the way up through the application," she said.

In the coming months, Weldon predicts the VANs will respond to the AT&T announcement with their own alliances with applications players such as Lotus, Microsoft Corp. and Novell.

Such alliances are already taking shape at companies such as GE Information Services (GEIS) and Infonet Services Corp.

GEIS plans to use its prominence as an EDI and E-mail provider to let customers send both structured and unstructured documents via a single service, according to Steve Humphreys, vice president of information delivery services.

Late this summer, GEIS will bring out an integrated messaging client that can handle both document types, to be followed by the fall launch of object-based messaging that will make it easier for customers to reuse existing code. For example, a company will be able to set up an E-mail or EDI connection with a new trading partner relatively easily, according to Humphreys.

See VANs, *page 32*

CompuServe, Sprint build up outsourcing

While some value-added network (VAN) providers are looking to add multimedia extensions to their E-mail offerings, others are sticking to more traditional pursuits such as outsourcing and network management, albeit with some new twists.

CompuServe, Inc. is looking to turn its expertise in outsourcing into turnkey service and software packages.

Traditionally, customers have asked CompuServe to put together custom networks for such applications as remote access to Notes servers. But within the next few months, the carrier hopes to develop standard service packages that customers can fairly easily drop into place, according to Dennis Brouwer, CompuServe's manager of network product marketing.

For its Notes service, CompuServe is using remote access software from TechSmith Corp. in Lansing, Mich., the same company it is working with to develop packages for such applications as remote access to SQL servers.

Aside from supporting application packages, some VANs are finding other ways to reach further into client firms to add value to services.

Sprint Corp. launched its managed network service with support down to the customer router. Beyond that point, Sprint so far has relied on local-area network integrators, such as Grumman Data Systems and Support Corp., to handle network support.

Now demand is pulling Sprint in even deeper, according to Bernie Schneider, director of product management. Customers are asking for broader support, and the company will add support for Frame Relay Assembler/Disassembler (FRAD) shortly.

That step will allow the carrier to take on the conversion of legacy Systems Network Architecture nets to frame relay. Beyond FRADs, the company is considering management of hubs and file servers, Schneider said.

BY BILL BURCH

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VANs

Continued from page 30

"The way a lot of these software and services are architected today, that's a very complex thing," Humphreys said.

To ensure that easy connectivity, GEIS is working with operating systems companies to encourage support for standards-based object-oriented technology.

Like GEIS, Infonet is working to make its E-mail service more versatile. On Thursday, the company will announce Notice Xchange, an E-mail gateway service that will support protocol conversion and multimedia, according to Bill Wolfe, Infonet's director and general manager for electronic messaging. Supported local-area network packages will include Microsoft Mail, Lotus cc:Mail, Novell's Message Handling Service (MHS) standard and systems based on the Simple Mail Transfer Protocol.

VANs travel in new directions

VAN providers are looking to offer services such as:

- LAN mail gateways
- EDI and E-mail integration
- Broader X.400 support
- Multimedia E-mail
- Outsourcing and managing customer premises equipment such as routers
- Electronic software distribution
- Remote LAN access
- Internet access

For most users, Infonet's plan for the X.400 E-mail standard will be of more interest. In the next few months, Infonet wants to offer X.400 service to Transmission Control Protocol/Internet Protocol users, and it is currently talking to potential beta sites about trialing the service, Wolfe said. The carrier is also interested in letting Windows users access X.400 services asynchronously, he said.

"Infonet has every intention of supporting [asynchronous Windows access] in the next 12 months; then we can get into all sorts of mail-enabled applications," he said.

MULTIMEDIA NEEDED?

Despite Infonet's plans for multimedia, users may not be all that eager for the service. Vought Aircraft Co. in Dallas currently uses EDI from Harbinger EDI, Inc. in Atlanta and E-mail from AT&T to communicate with about 55 suppliers and clients. That traffic is still predominantly text files, according to Ray Day, Vought's manager of EDI systems.

Vought is considering sending computer-aided design and manufacturing drawings to the few partners that can handle digitized drawings, although he said the price for sending such large files must come down first.

In addition, the company is interested in value-added services, such as a VAN version of Lotus Notes. However, Vought wants to see technical specifications and pricing before diving in, Day said.

Some believe users are already moving away from VAN E-mail services. Exceptions are companies needing a gateway between mail packages or those faced with running large modem farms. Such firms might need a VAN for E-mail, according to Chris Finn, an analyst with TeleChoice, Inc., a consultancy based in Verona, N.J.

With the Internet now popular for casual communications, private mail servers and direct dial-up can handle the rest of E-mail traffic for many users, Finn pointed out. The VANs "just seem ill-prepared for the way that remote networking has moved," he said.

Pricing

Continued from page 28

contract tariffs in place today, although some of those are for unimpacted data communications services and SDNs. But "most contract tariffs are affected," an AT&T spokesman said.

"My personal opinion is this is a carrier strategy to lock in business through contracts" that fix rates for three to five years, said Bill Coopman, manager of telecommunications at AT&T shop Deere & Co. in Moline, Ill., and chairman of council for the International Telecommunication User Group.

"The message is that if you don't have a contract, we're going to continue to squeeze the pricing vise until you say, 'ouch!' " he said.

AT&T stated that the latest round of rate hikes is in response to the rising costs of doing business. A big chunk of interexchange carrier costs is associated with local access rates — what long-distance carriers pay to link to local nets. However, these prices have been falling for several years (see graphic, page 28).

In addition, the statement contradicts AT&T's most recent annual report: "Total costs of telecommunications services declined this past year.... Despite higher calling volumes, access and other interconnection costs dropped...largely because of lower prices from telephone companies to reach customers over local networks."

An AT&T spokesman said the rising cost of doing business includes investing in new services and enhancing AT&T work centers for improved customer service such as better billing statements.

➾ Paulak is associate publisher at the Center for Communications Management Information in Rockville, Md., and a *Network World* columnist.

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Processor Activity
1
2
3
4
Low
High
Low
High
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RATE & TARIFF MONITOR

by Eric Paulak

Does Citibank know about this?

One of the advantages of being a Fortune 500 company used to be that you could guarantee large volumes of traffic and, as a result, get big discounts on long-distance services.

While that's still true, during the past 60 days, AT&T has signed several new contract deals for its CustomNet service that give bigger discounts to virtually any business customer.

It's a boon for small and midsize businesses. But it's got aggregators and resellers crying foul, and it should have AT&T's largest customers wondering why they can't get the same discounts when they commit to millions of dollars in usage.

Here's how it works:

If you commit to at least $200 per month in total inbound and outbound traffic for one year under AT&T's Contract Tariff No. 951 — which is for CustomNet, Option S — AT&T will give you a 35% discount off of its standard CustomNet rates. Plus, you'll already qualify for a 3% discount under the standard tariff. Sign up for two years and you get an additional 5% discount.

By the way, the $200 minimum is after the discounts are applied.

The 3% or 5% discount is taken after the 35% discount is figured in, so you end up with a total discount of 36.95% to 38.25%, not 38% to 40%.

So under AT&T's Contract Tariff No. 951, effective March 2, with a one-year commitment, you end up paying $.16393 per minute for outbound service and $.17339 for inbound 800 service. That's a 36.95% savings over the standard tariffed CustomNet rates of $.26 for outbound and $.275 for inbound.

The only requirements for the CustomNet deal are that you meet the monthly revenue commitments, get a competitive bid or switch from another carrier and limit the number of sites covered under the deal to no more than five.

For large users, the biggest discount AT&T offers is 23% under its Customer Specific Term Plan. And that requires a $600,000-per-year volume commitment!

How can AT&T offer such big discounts for small commitments?

Bob Schieb, CEO of Global Long Distance Marketing, an aggregator based in Florida, says it's because "AT&T's down in the gutter playing a price-gouging game."

As a result, Schieb thinks these new AT&T contract tariffs are threatening his business, and he's probably right.

The best deal he can offer on outbound service is around $.21 per minute under a Multi Location WATS plan.

The best rate you can now get directly from AT&T under its Contract Tariff No. 951 is $.151 per minute. For that rate, you have a higher revenue commitment of $5,000 per month for two years. But even if you only commit to $200 per month for one year, you can still get the better rate of $.16393 per minute.

AT&T's response to all of this?

First of all, AT&T says it's not trying to compete with resellers and aggregators — after all, they are buying service from AT&T.

Tell that to Schieb, who is so upset about the new deals and some other AT&T actions toward resellers and aggregators that he's trying to drum up support for a class-action law suit against AT&T.

AT&T also says that while the CustomNet discounts offered under the CustomNet contract tariffs may be higher than what its largest users get, AT&T's largest customers still pay lower per-minute rates. That is true, but there is a caveat. They also pay AT&T a whale of a lot more in overall costs.

An AT&T Tariff 12 Option 63 customer, for example, gets rates of $.099 to $.197 per minute, depending on the distance of the calls. To qualify for Option 63, however, you have to commit to $1.08 million per year in volume for three years.

CustomNet is designed for small businesses with several locations. But with deals like these, any multilocation company can get a good deal.

It may, however, take dividing up locations under several CustomNet accounts to meet the location limitations.

➡ Paulak is associate publisher for the Center for Communications Management Information in Rockville, Md., a provider of rate and tariff information. He can be reached at (301) 816-8950, Ext. 327.

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You'll see firsthand the significant savings of public switched video rates compared to the dedicated circuits that were previously required.

You'll also see how new national standards allow you to quickly and easily connect with virtually every existing system. And how this new flexibility can be applied to basically every industry.

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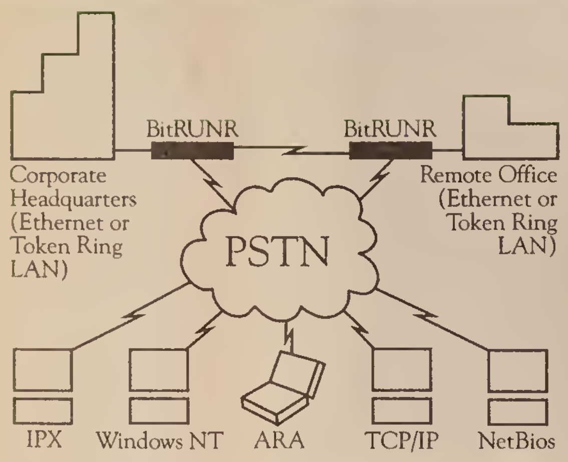
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Now you can extend the power of your enterprise system to all your remote users. With BitRUNR by UDS, your mobile users, telecommuters and branch office workers will enjoy easy, seamless access to the corporate network.

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ELECTRONIC FORMS

Time savings taking form at Motorola unit

BY ADAM GAFFIN

Scottsdale, Ariz.

Jack Napier estimates that his users save three minutes every time they fill out a form on-line rather than on paper.

It doesn't sound like much — that is until you multiply it by the estimated six million paper forms printed last year for employees at the Motorola Government and Systems Group, where Napier is project manager for forms automation.

The time savings could increase even more when the firm's nascent electronic forms program is integrated into a work flow net, Napier said. That could happen as soon as next year, he said.

Motorola's forms formula

Number of paper forms:

700

Number of forms on-line:

80

Estimated total man-hours saved annually when all go on-line:

300,000

SOURCE: MOTOROLA GOVERNMENT AND SYSTEMS GROUP, SCOTTSDALE, ARIZ.

The Motorola plant is one of a growing number of facilities worldwide that are replacing paper forms — or even mainframe-based electronic forms — with packages based on client/server technology and local network electronic mail nets. Analysts said the market for forms based on E-mail will continue to grow as companies seek to leverage their investments in LAN-based E-mail nets.

NEW PACKAGES UNLEASHED

During the past three months, several vendors have announced new or upgraded forms design and routing packages. In March, for example, JetForm Corp. of Waltham, Mass., announced a client/server version of its multiplatform forms package. Earlier this month, Lotus Development Corp. and IBM separately announced LAN-based packages. And Microsoft Corp. has announced plans to make its current forms package, which requires the use of Visual Basic, easier to use. Meanwhile, Uarco, Inc., a paper forms provider in Barrington, Ill., recently announced software to help customers develop document and forms management libraries as well as connect electronically to Uarco's forms designers.

The 3,000-employee Motorola plant began cutting over to a forms package from F3 Software Corp. of Ft. Lauderdale, Fla., last fall.

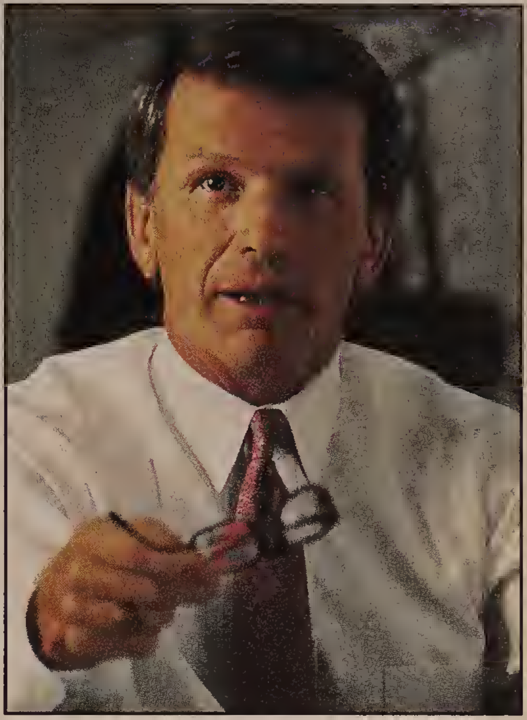
Napier said he had already been using F3 software to design and review paper forms before they were printed, mainly because vendors used by Motorola also employed the package. This made it easy to review proposed forms via modem, he said.

CUTTING BACK ON PAPERWORK

The Motorola, Inc. unit now has about 80 of its roughly 700 forms on-line, stored in a central Novell, Inc. NetWare server supporting mostly Windows clients. Many of the forms are designed to access back-end databases so users can fill out specific fields by selecting from a menu, Napier said. For example, workers returning from trips and filling out expense

See Motorola, *page 47*

Oracle in the fast Lane: targeting workgroup



Oracle Corp. has recently been developing multimedia, object handling and workgroup technologies that will put its products in direct competition with Lotus Development Corp.'s Lotus Notes groupware offering. At the same time, Oracle is presenting its relational database management system as the logical anchor for large Notes installations.

Is Oracle sending a mixed message or just covering all the bases?

Network World Senior Writer Kevin Fogarty last week spoke with Ray Lane, Oracle's president of worldwide operations and executive vice president, to find out just where the company is headed. Lane also discussed Oracle's core database offerings and what's unfolding in that market.

What role should databases play in anchoring workgroup applications such as Lotus Notes, and what is Oracle doing to address that market?

There are two directions we are taking. First, we have put all the products we believe are important to the group environment in one division — the Media Server, Oracle Office, Text Retrieval, and Context, which is a document manager. We are probably going to look to the outside to acquire work flow software. But we are delivering all of these other products this year, which will give us a very robust groupware offering. Our chief advantage [in marketing workgroup software] will be Oracle7 sitting underneath it.

The other approach is to have Lotus and others in this marketplace actually using Oracle7 [with their own products]. We're pursuing that.

Why the move against Notes?

The Lotus Notes approach is absolutely the right way to go. It is a database; it just isn't a very good one. Lotus really pioneered the concept of replication services. We'll take that a step further [and] provide a Lotus Notes capability, but with a very robust database capability hooked to the corporate database. There's no question that this sends us into competition with Notes, but it's not the reason we're doing it.

We've been working for some time on relational object, text retrieval, video and audio technology with Media Server. This whole interactive multimedia area is where databases are going — [they won't be just] relational databases anymore.

Most of the talk about video on demand involves home use. What can corporations use it for?

We'll provide the raw technology. Then we think there will be hundreds and thousands of start-ups that will invent applications for the corporate environment —sales training, interactive learning programs, any type of multimedia applications that companies [can use]. Independent software companies will start inventing these applications, as [will] our users.

We don't plan to try to sell applications to corporations in the interactive multimedia area.

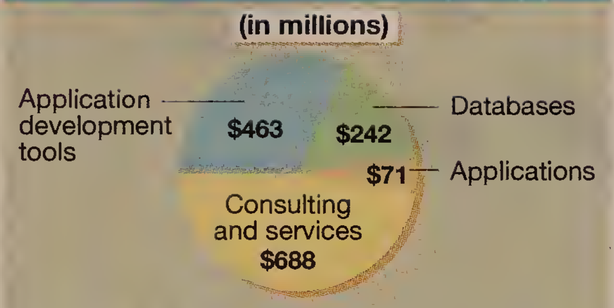
Do you expect to see more consolidation of the database industry?

Yeah, I do. IBM is [investing heavily in] DB2/2 and DB2/6000, and they have a long way to go. [Proprietary] relational database providers will be under pressure to ask 'If we don't have at least 10%, maybe more like 15% of the [Unix-based relational DBMS systems] market, can we afford to play?' I think you'll see them fall by the wayside.

See Lane, *page 47*

Oracle's revenue breakdown

(in millions)



Based on Oracle's 1993 revenue of $1.46 billion.

GRAPHIC BY TERRI MITCHELL

BRIEFS

Nomadic Systems, Inc. of Mountain View, Calif., last week announced an enhanced version of its **file-transfer and synchronization** software.

SmartSync reduces network and modem traffic by only swapping changes in files or directories, and only after the changes have undergone data compression.

Version 2.0, to be released in June, adds support for Novell, Inc. NetWare peer-to-peer local-area networks, filters for limiting the number and types of files to be exchanged, and one-way broadcasts of information. SmartSync currently runs on Windows platforms on NetWare 3.11 or higher networks. Pricing starts at $495 for a five-user license.

Nomadic: (415) 335-4310.

XDB Systems, Inc. of Laurel, Md., last week announced a new version of its **database server** application. XDB-Server 4.0 lets clients connect to multiple remote servers and includes a variety of new network security and administrative tools.

The software works with front-end applications developed with tools from PowerBuilder, Inc., Q+E Software, Inc. and others. The server runs on Windows NT, OS/2, Novell, Inc.'s NetWare and IBM's LAN Server. Pricing starts at $2,495 for a five-user license.

XDB: (301) 317-6800.

Qualcomm, Inc. of San Diego recently announced the release of its Eudora **electronic mail** package for Windows NT and OS/2 platforms. Eudora is based on Transmission Control Protocol/Internet Protocol.

Pricing starts at $65 per license.

Qualcomm: (619) 587-1121.

Freemont, Calif.-based **Independent Technologies, Inc. (ITI)** has announced the first revision to the Data Access Language (DAL), a **middleware** product it licensed from Apple Computer, Inc. in January.

The new release includes both Macintosh and Windows client versions, and supports Microsoft Corp.'s Open Database Connectivity (ODBC) application interface specification. The DAL server software can be used to link any ODBC-compliant application to one of 35 databases on a variety of servers.

Client prices start at $149 per user. Server prices range between $995 and $30,000.

ITI: (510) 438-2000.

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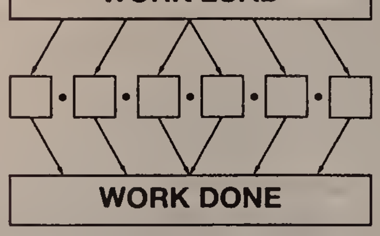

And recent, dramatic IBM breakthroughs are what have put

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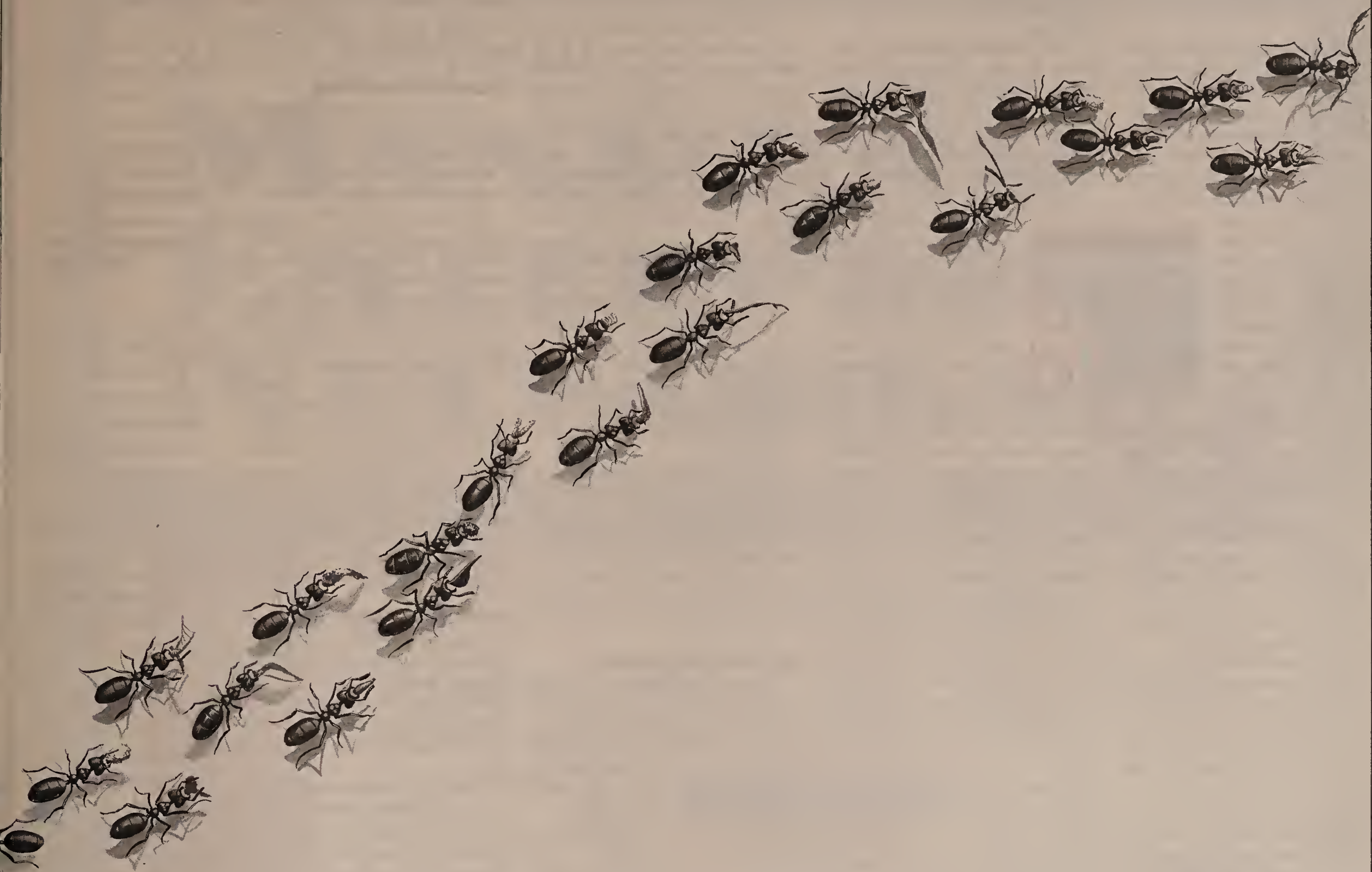

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DBMS

Continued from page 1

one machine or across a network. Databases also need to support a more diverse array of data types for multimedia applications, and customers are demanding better management tools.

"I want to be able to submit a program, and if there's idle CPU time on a node in Boston, I want [the program] to go and make use of that machine," said Michael Corey, president of the International Oracle Users Group (IOUG). "Ten years out, I want to get to the point where when the Singapore office is closed down, jobs initiated at the Boston office are routed to Singapore to take advantage of those machines. I want the programs to take my global network and make it run at full capacity."

IT'S ALL RELATIONAL

None of these things were issues when E.F. Codd, then a researcher at IBM, laid out the principals of relational database management systems in a series of papers starting in 1969.

Relational databases started as tools on monolithic mainframe systems, but now they even run on desktop platforms. And increasingly, users seek to create true distributed networks in which multiple applications and databases can work with each other.

But many are held back by a number of issues, from the complexity and cost of duplicating mainframe applications across a heterogeneous client/server network to concerns over security and performance.

Shaku Atre, president of Atre Associates, Inc., a client/server consulting firm in Port Chester, N.Y., estimated that 90% of corporate data remains stored in nonrelational mainframe databases, in part because of such concerns. Major relational DBMS vendors argue that they are addressing such user worries.

"The world is going for more multiprocessing and more dependence on the network," said Ray Lane, president of worldwide operations and executive vice president of Oracle Corp. "It's critical that our database product operate with every operating system and work with every network protocol."

Oracle has offered massively parallel processing since 1991, although only on specialized NCube parallel processing hardware. It also offers rich database replication options and is working with third-party vendors to produce tools by year end to manage distributed storage and processing, said Jnan Dash, Oracle's vice president of product strategy and technology.

IBM, Informix Software, Inc. and Sybase, Inc. are also jumping on the parallel processing bandwagon with products on the market or under development that will run on specialized hardware like the former NCR Corp.'s 3600 massively parallel processors.

Marilyn Bohl, until recently a senior vice president at The Ask Group, Inc., said the firm's Ingres relational DBMS also offers replication tools and cluster multiprocessing. The company, which last week said that it would be acquired by Computer Associates International, Inc., plans to release next year a massively parallel multiprocessing version of its relational DBMS that can support as many as 100 processors simultaneously.

Current offerings from all the major database vendors, however, fall far short of users' wishes to "have a single database that is spread over 10 or 100 or even 1,000 sites," said Michael Stonebreaker, a professor of computer science at the University of California at Berkeley. Stonebreaker helped find Ingres (now part of The Ask Group) and is the founder of Montage Software, Inc. of Oakland, Calif., which develops object-oriented relational database tools.

Relational DBMS vendors currently offer a "Volkswagen version" of distributed database management that will run but not at high speed or with any elegance, said IOUG's Corey, who is also vice president of the Database Technologies, Inc. consulting firm in Sudbury, Mass.

Corey wants database vendors to smooth out the process of distributed computing by automating most of the management. Just as telephone systems will reroute a call to avoid a network hang-up, Corey wants his relational DBMS to shunt data around downed network nodes and find another communication path without any help from a database administrator.

"You want encapsulation of location, meaning that you don't really want to know where the hell [a data source] is, in terms of a physical address," said David Truch, senior technical specialist for Anchorage, Alaska-based BPX Alaska, Inc., and a former Sybase user group president. "You want a small group of people to manage that with the appropriate tools."

The ASK Group's Bohl said future versions of the Ingres database will include most of the communication and database management tools as part of a parallel processing engine Corey and Truch are looking for.

"One of the benefits of a relational database is that the system itself figures out access paths to data, then goes to get it," she said.

Oracle is also working with Hewlett-Packard Co. and IBM to create a Simple Network Management Protocol Management Information Base to integrate database and net management.

"It isn't just a single relational database vendor that can make this thing happen," Truch said.

REPLICATION NATION

When a user designs a system that includes dozens or even hundreds of geographically dispersed databases, reliable replication is vital, especially for a mission-critical application, Truch said.

Stonebreaker explained that vendors still have a fair amount of work left in developing good algorithms that can guarantee the replication of transactional information across a network of distributed databases.

"Most of us have replication services, but we all define it differently," Oracle's Lane said. "[Oracle believes that replication] has to be delivered as an update-anywhere kind of function, not just taking snapshots of the database to use in a remote environment."

Replication becomes even more complex when employees take work on the road with their laptop computers. Version control is then needed as they attempt to load the changed information back into their home-office databases, Stonebreaker said.

WORKING TOGETHER

As with many other client/server tools, users often have a variety of relational databases on their nets, Atre said. "Accessing those heterogeneous platforms has not been easy," she said.

Most major vendors offer gateways, middleware or application program interfaces (API) that their customers can use to access data stored in a competing database. But porting applications from one to another, or from a legacy system to a client/server net, can be a long and costly nightmare, Atre said.

The SQL Access Group, an industry consortium, said one answer could come with its Call Level Interface, an API for connecting disparate databases. At this week's DB/EXPO '94 show in San Francisco, the group and the National Institutes of Standards and Technology will demonstrate a prototype application that eliminates the need for gateways between databases.

AN OBJECTIVE APPROACH

Looming over all this, however, is a tidal wave of large and complex objects, such as multimedia files. Relational DBMS products were really designed to store numerical values — for example, those used in accounting or billing systems.

But recent years have seen the emergence of object-oriented databases better suited for handling complex data from a slew of small vendors. Industry observers said relational DBMS vendors will increasingly add object-oriented functionality to their software to handle complex data sets. In this environment, relational DBMS products could become tools for managing large collections of data stored across an enterprise in other types of databases, such as object-oriented and multidimensional ones.

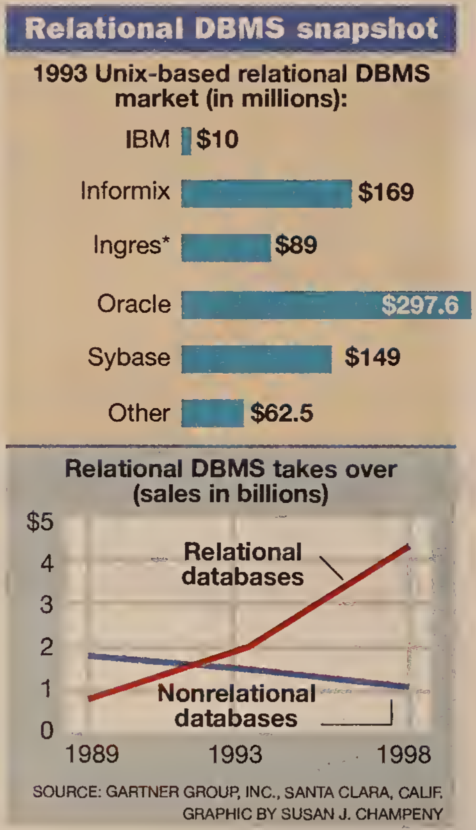
"The client/server [relational DBMS] stuff we're seeing now is all very nice and fine, but it's only a step on the way," said C.J. Date, a Healdsburg, Calif.-based consultant and relational DBMS text book author. "Relational vendors ought to be doing whatever they can to incorporate the good ideas of object-oriented [databases] into their products."

Vendors said they are doing just that.

"If you're going to be a database supplier in the late '90s, you've got to have a database that not only handles relational data, but objects, images and unstructured data," Lane said.

See DBMS, *page 79*

Relational DBMS snapshot



SOURCE: GARTNER GROUP, INC., SANTA CLARA, CALIF.
GRAPHIC BY SUSAN J. CHAMPENY

THE QUOTE DATABASE

"It's probably a misnomer to call these products relational databases anymore."

– Umang Gupta, president and CEO, Gupta Corp.

"Relational vendors ought to be doing whatever they can to incorporate the good ideas of object-oriented [databases] into their products."

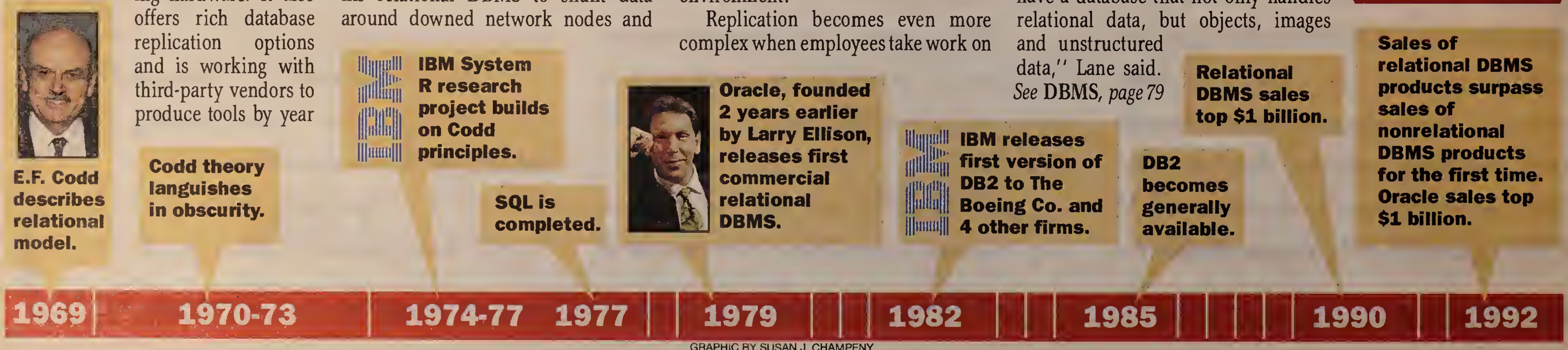
– C.J. Date, author and consultant

"The first generation of relational databases was a kind of a plague on the data processing world."

– David Brunel, president, Unidata, Inc.

"We were assured that access to data from various platforms [across a network was] going to be very easy. That's not easy at all."

– Shaku Atre, president, Atre Associates, Inc.


E.F. Codd describes relational model.
Codd theory languishes in obscurity.
IBM System R research project builds on Codd principles.
SQL is completed.
Oracle, founded 2 years earlier by Larry Ellison, releases first commercial relational DBMS.
IBM releases first version of DB2 to The Boeing Co. and 4 other firms.
DB2 becomes generally available.
Relational DBMS sales top $1 billion.
Sales of relational DBMS products surpass sales of nonrelational DBMS products for the first time. Oracle sales top $1 billion.
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GRAPHIC BY SUSAN J. CHAMPENY

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Lane

Continued from page 40

Now IBM obviously has deep pockets and it'll continue to hang in there, but you'll continue to see more pressure on IBM to not play in the database world.

You don't see new versions of DB2 as a threat?

DB2/2 in the next five years will be product that is potentially competitive because of the experience brought down off DB2 on the mainframe. But three to five years is going to be a long time to hang in there. At IBM, for the first time in 30 years you have to make decisions on what you're going to invest in. And I don't know if DB2/2 or DB2/6000 is going to make the grade. Since it's IBM, I have respect and I certainly see IBM as a player; but the company is starting with virtually no market share [in Unix environments].

How about some of the other vendors?

[Sybase, Inc. will] have problems with scalability. I don't see how they're going to take their current product and work in a multiprocessor environment in the 100G-byte world. I think they prosper today because this is a very robust market in the 1[G-byte] to 5G-byte area, and everybody wants to buy relational databases that are open, have [graphical user interface support] and all that, distributed.

Informix [Software, Inc.] has value-added resellers who have built applications, and you don't know Informix is there when you buy the application. Clients are looking to make standards decisions on the relational database today, and Informix does not have a direct sales force out there today that is able to control those standards decisions.

So yeah, I think it will consolidate. If IBM wants to throw a lot of money at the problem, I think it will have a lot of success. And as IBM does more [business] and Oracle does more, it will hurt Informix and Ingres the most. I think [Sybase has] still got plenty of legs and it'll stand in there as a $400 million company.

Given the competition, where are you putting your research and development dollars these days?

Oracle8 will be an object-oriented database, and it will have the Media Server capabilities built into it to handle audio and visual information.

The second major investment is more reliability, availability and serviceability. Today, Oracle7 is as reliable as any relational database in the business, except maybe DB2 on the mainframe. What we've got to do is set DB2 on the mainframe as the benchmark to beat. So we're working on a lot of things in Oracle8 to get the reliability at that level — having multiprocessing capabilities with an extremely low failure rate is our goal.

Oracle's into workgroups, applications, databases, groupware and everything else. Are you spreading development efforts too thin?

We've got about 1,300 to 1,400 developers, and they're all separated into four major product families. I think that protects us. It does give us some strain when we try to take all of this software we've developed and make it work on all the platforms we support. But we think we're well within safe bounds. There may be at any one time [the situation] that one of the products may not be the top product in its field. But they'll all be one of the three top products in their field.

Motorola

Continued from page 40

reports can select the city they visited from a list. The system then fills in their per-diem allowance and the city code.

Napier estimated that filling out an on-line form saves about three minutes because workers no longer have to root around for a paper form, use a calculator or look up various values. Processing the form also takes less time, because workers are less likely to make mathematical or other errors, he said.

And this is with a system in which the forms are still printed out on paper for routing via internal mail.

Napier said electronic routing has to wait until Motorola implements a corporatewide net security system, because many of the forms involve potentially sensitive personnel or financial data.

He said a system could be in place by the middle of 1995. Once that is installed, he said he would move quickly to implement an on-line forms routing system.

Process reengineering is vital to forms automation, Napier said. Otherwise, whoever is put in charge of the process will face the near-impossible task of trying to put them on-line, especially if different departments have different forms for similar purposes, he said.

When Napier started at Scottsdale in 1989, the plant had 4,300 forms, many of them variations on a single theme. There were four separate vacation request forms.

"You need to get rid of 2,000 forms is what you need to do," Napier said he would tell users at other companies.

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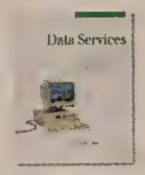

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EDITORIAL

The real enterprise net

On occasion, I'm asked to explain just what an enterprise network is — *Network World* being, after all, the newsweekly of enterprise network computing. After eight years of rote recital, the answer rolls from my lips with nary a pause: An enterprise network is an information infrastructure that links every facet of an organization — from the loading dock to the boardroom — and ties in customers and suppliers.

But lately I've been thinking how little progress we've made in achieving the second half of that definition — linking customers and suppliers.

Beyond keeping the fax machines churning all day, we really haven't done a great job of bringing business partners onto our networks. Sure, many companies have embraced EDI to streamline narrow segments of their business relationships, but we're nowhere near the kind of integrated communications envisioned by electronic commerce proponents.

We haven't embraced the strategies and technologies that will enable us to bring people outside the company into our teams in a fluid way.

This is a question that we, as a publishing company, are wrestling with as the digital era changes the way information is delivered. How do we complement the traditional print vehicle to better serve our readers? How, in essence, do we bring them onto our network for new kinds of information?

The issue is also on my mind because of AT&T's recent deals with Novell and Lotus, deals that just may finally transform the cloud — the telecommunications network — into the computing services platform the carriers have been promising for a decade or more.

Most of the focus has been on how these deals will help you link remote sites and mobile users. But if AT&T can extend your own data and applications to the outermost boundaries of your business domain, consider what that means for enterprise networking. All of a sudden, you have a common applications platform at every point of presence through which business partners can access your network. Serendipity, baby.

AT&T is only one example. Rival carriers, cable companies, Internet providers and other pipeline providers all intend to offer similar capabilities.

But what's needed to profit from this shift is a sea change in thinking. Companies have to view themselves as content providers and, like publishing companies, answer the questions: What information, services, applications — in other words, content — can I post on the provider's network that will make it easier for other companies to work with me? How can I shift the work of maintaining the gateways, managing the servers and replicating the data to network providers so I can make this intercompany network real?

The network providers need pioneering users if they are going to move to their next level. If you work with them now to answer those questions, you'll be way ahead of the game.

JOHN GALLANT jgallant@world.std.com

TELETOONS FRANK AND TROISE

Hey, Mom, is that what they mean by Middleware?
Phil Frank

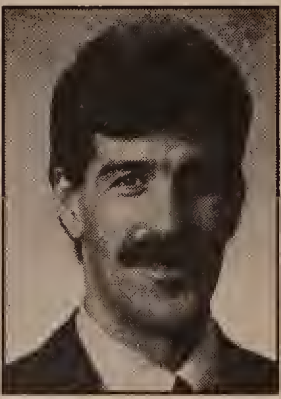
NETWORLD+INTEROP 94

by Jeffrey Kaplan

Flashy vendor gimmicks overshadow customers' needs

About 65,000 people converged in Las Vegas this month to attend the first NetWorld+Interop conference. Many of these people were users hoping to learn about the latest in networking technology and services, and looking forward to sorting out the myriad of options available to them.

While some may have successfully identified the best product or service to meet their needs, my guess is a larger contingent came away from the show even more confused than when they arrived. If this is true, the show may have failed to help these customers feel comfortable with their networking strategies and make sense of the chaotic array of conflicting messages propagated by competing vendors.



The fact is, the networking industry is adopting much of the same needless hype which has plagued the consumer market. As a result, it was not surprising to hear many attendees compare NetWorld +Interop to Comdex and the Consumer Electronics Show, two extravaganzas that also claim the same town as their home.

The biggest crowds at NetWorld+Interop were drawn to the most entertaining displays rather than the most enlightening. Laser and magic shows, virtual reality demonstrations and cute skits were the most popular attractions. The irony is that, while these show-biz techniques draw the largest audiences, they do the least to educate customers about the latest in networking technology.

It is easy to suggest after four days at NeWorld +Interop 94 that the networking industry has fallen into the hands of an odd assortment of actors and magicians pushing smoke and mirrors and virtual reality on customers, rather than real solutions to meet customers' ibusiness application needs.

As proof of the limited value of this type of marketing, everyone I talked to mentioned the rock climbers scaling a mock cliff, but no one could remember who had sponsored this questionable display.

There were other haunting messages that emerged from this surreal fantasyland. A surprising number of vendors erected fortress-like booths, which did little to suggest an open systems approach to the market. Others took advantage of the local pastime, slot machines, as a come-on to prospective customers. What a message: Buying products from these firms is comparable to a game of chance.

Maybe this is an extreme interpretation of the underlying significance of a lighthearted approach to differentiating products in an increasingly commodity-driven market. If customers really wanted to take a hard look at the latest in today's networking technology, they would probably spend more time at the conference's workshops and seminars, and less time waiting in line at the virtual reality demonstrations and seeing the local sites. But, there is reason for concern and consternation about the way in which this industry is evolving.

Dataquest's most recent customer survey conducted in conjunction with *Network World* found that many customers desperately need help evaluating, implementing and managing their corporate networks. As information technology's promise of greater operating efficiencies grows, customers are looking for greater help from their vendors in making this promise a reality.

More and more customers are studying how they can further extend the value of their nets as interenterprise commerce tools, connecting them more closely to their customers, suppliers, partners and others. These are the promises presented in trade journals and by industry gurus.

Yet precious little insight and advice on these important issues could be found at the show. Instead, it was a showcase of more bits vs. bytes. It is no wonder that many customers left the conference with an empty feeling.

The purpose of these observations is not to point blame at NetWorld+Interop 94's organizers or participants. However, this show makes it clear that equipment vendors, consulting firms, systems integrators and value-added resellers who are designing and building the latest in networking technology need to help customers learn how to apply these solutions to meet their business requirements.

Unfortunately, firms interested in doing this were in short supply at NetWorld+Interop. And some vendors who do have some of these skills hide their capabilities in this area in favor of trying to out-gun their closest competitors, based on the speed of their products, rather than the skills of their people.

For their part, customers should seek out those suppliers who can demonstrate real solutions, rather than slight of hand. When you attend a show like NetWorld+Interop 94, look for vendors who can help you navigate through a confusing marketplace and apply technology to meet your business needs, rather than dazzle you with technology tricks without real business benefits. These are the companies that can help you ensure that the latest networking technology lives up to its promise within your organization.

Kaplan is a director at the Dataquest Worldwide Services Group in Framingham, Mass. He can be reached at (508) 370-6174.

Be in touch

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Is Novell, Inc.'s acquisition of WordPerfect Corp. good news for the networking community?

PRO

BY JOHN R. RYMER

Novell's plan to acquire WordPerfect is currently raising the ire of customers, investors and many observers. However, in hindsight, this deal will be viewed as being beneficial, particularly to users and independent software vendors (ISV) because it strengthened the NetWare platform upon which they rely.

After unsuccessful attempts to break into new markets, Novell is focusing on expanding the range of products it sells to NetWare customers. The key to this strategy is a series of application services — software modules that augment basic NetWare to support multimedia, telephony, image management, database, electronic mail and other client/server applications.

Unfortunately, these NetWare applications services have achieved mixed results at best. Part of the hang-up has been Novell's insistence that customers upgrade to NetWare 4.X before they can use many of the modules. The upgrade is painful, causing many NetWare 3.X customers to put it off.

In addition, sales of the NetWare application services have been slow because, until developers build applications that employ the services, there's little reason for users to buy them. Novell was caught in a dilemma: The company needed applications to help users appreciate the value of NetWare and its application services, but third-party developers were too slow in producing these applications. Novell's response was to enter the applications business. WordPerfect gives Novell a viable desktop suite to get started with. WordPerfect Office has taken its lumps for having integration shortcomings, but those should disappear now that Novell has also acquired Borland International, Inc.'s Quattro Pro product. Novell can modify the Quattro Pro code to improve integration with WordPerfect's applications.

WordPerfect Office will continue to face stiff competition from Microsoft Corp.'s Microsoft Office and Lotus Development Corp.'s Smart Suite. However, watch for Novell to change the dynamics of the competition by bundling WordPerfect Office and NetWare at an attractive price. The WordPerfect Office/NetWare bundle will offer a complete solution in a box: office applications and LAN operating software.

A critical test for Novell will involve E-mail. Novell is committed to Message Handling Service (MHS), a system which is technically inferior to the WordPerfect Office messaging technology.

WordPerfect's E-mail provides elements of client/server processing and strong message-tracking facilities, and is required to run the attractive calendaring, scheduling and task management features of WordPerfect Office. Will Novell seek a compromise to placate warring product groups or offer a solid product that meets customer needs?

The initial reaction to the deal among ISVs and other Novell partners was negative. With WordPerfect as the nucleus of a new applications division, ISVs fear Novell, like Microsoft, will become a platform vendor with an applications ax to grind. However, if the deal makes Novell stronger and helps spread the NetWare services, ISVs will be better off than they are today. And users will profit from the availability of more and better products.

In order to thrive, Novell is abandoning its attempt to become an ecumenical, open supplier of distributed computing services to application developers. Many users and ISVs don't want Novell to make this change. They believe Novell has reversed its commitment to an open applications platform. But Novell's heavy investments in application program interfaces of all types indicates that the company is not abandoning its commitment to openness and support of multiple platforms. However, Novell has concluded that it needs more than openness to succeed.

Novell's old strategy was not producing results. Acquiring WordPerfect gives Novell a great opportunity to regain its lost initiative in the market, with users and ISVs benefiting in the bargain.

Rymer is editor in chief of "Distributed Computing Monitor," a monthly report by Patricia Seybold Group, Inc. of Boston. He can be reached at (617) 742-5200 or via MCI Mail at 467-1743.

CON

BY CRAIG BURTON

Novell's acquisition of WordPerfect does nothing to solve the real problems blocking the development of innovative network applications. It only treats the symptoms, diluting Novell's focus and slowing long-term progress toward addressing the real issues involved.

The next wave of growth in net computing is dependent on the emergence of collaborative applications. To date, no vendor has been able to encourage widespread development of those applications.

Ideally, net system software vendors should be creating the services needed by applications. Since few developers are willing to write applications to any single environment, net software vendors should also be creating isolation layers that let developers write applications that will run across multiple nets, not just their own. Third parties would be free to focus exclusively on applications, not applications and the networking software. This model is the only road to real applications innovation — not grandiose acquisitions like the Novell-WordPerfect deal.

In explaining why acquiring WordPerfect was necessary, former Novell Chairman Ray Noorda drew a parallel to the experiences of the minicomputer and mainframe marketplaces. In each of these marketplaces, he said, a maturity process occurred that left only a few major players. Now in the PC software market, a similar consolidation is happening, Noorda said. In acquiring WordPerfect, he claimed, Novell was doing what was necessary to ensure that the company remains one of those major players, alongside Microsoft Corp. and Lotus Development Corp.

This line of thinking is curious and misguided. Noorda's rationalizations for the acquisition imply that IBM and Digital Equipment Corp., which are both experiencing serious downturns, had the right business model; they only had the wrong technology model.

But the fact that market maturity usually means consolidation doesn't mean IBM and Digital had the right business model. That business model, in which a single vendor provides everything the customer needs, was and is unworkable. IBM and Digital provided a complete system: hardware, operating systems and applications. All the network industry has accomplished so far is hardware and transport independence. Now, Novell and Microsoft look like they're trying to provide complete software systems that consist of applications and operating systems, while they leave the hardware to others. That business model will, at a minimum, slow things down because it's equally cumbersome.

One vendor can't do all of those things well; only a robust third-party development market can fully realize the potential of network computing. In a third-party-based model, systems software vendors focus on creating the infrastructure of network services needed by applications, as well as a cost-effective development environment that gives applications access to those services. That combination will encourage more applications innovation and specialization than any vendor creating a monolithic software solution can ever achieve.

Truly innovative applications that allow nontechnical users to radically change the way they work are at least as hard to build as the services on which those applications rely.

Technologically speaking, Microsoft, not Novell, is in the best position to enable that third-party community and move networking to the next level. Microsoft's willingness to build network-independent clients and servers, and Windows Open Services Architecture are signs that Microsoft is doing what it takes to facilitate the development of network applications. This is what will benefit the networking community. Novell would be wise to take a lesson from Microsoft rather than to continue on its current path.

Burton is principal of The Burton Group, a Salt Lake City-based consulting firm. He can be reached at (801) 943-1966 or via MCI Mail at 513-4337.

Letters have moved this week to page 63.

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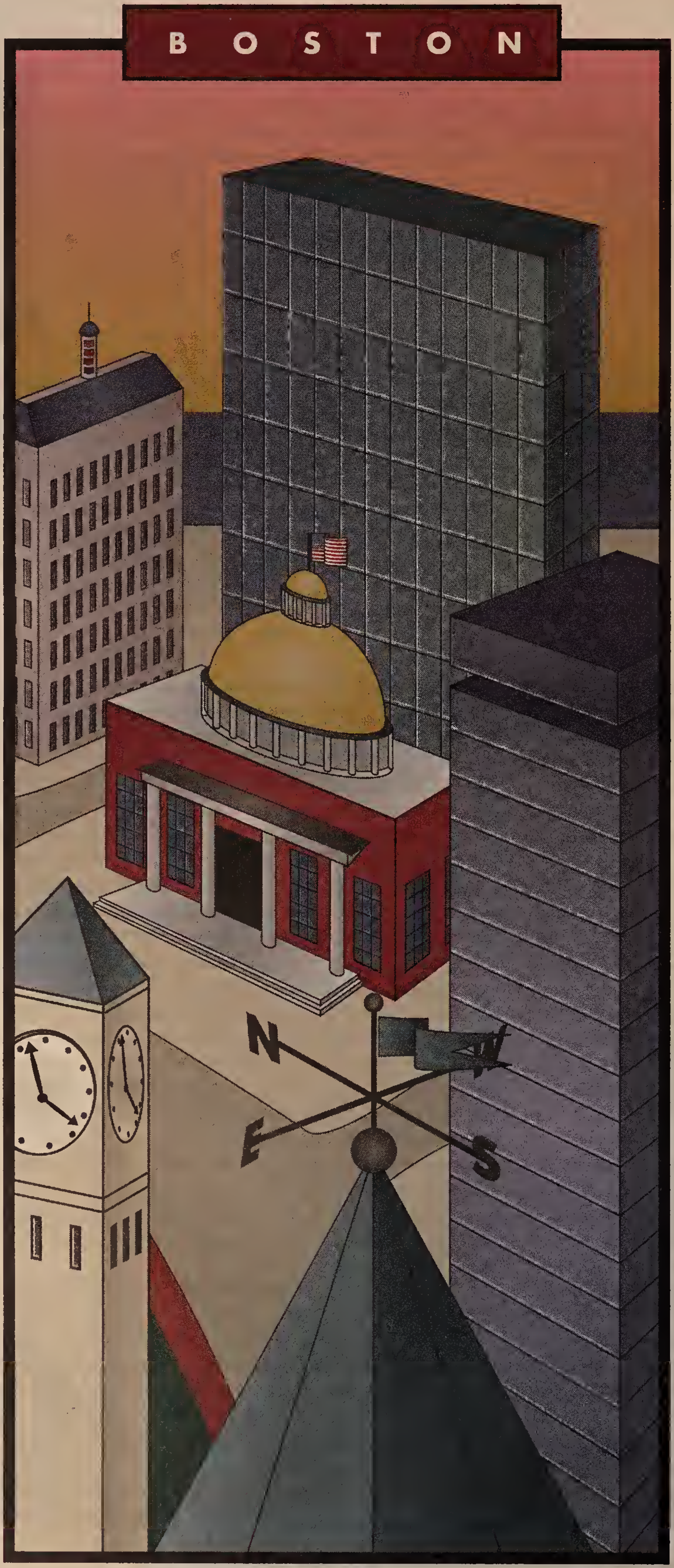

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RDBMS server choice gets tougher

Comparing products is difficult when feature sets are similar and servers must match application architecture.

BY MICHAEL GOULDE
AND WAYNE ECKERSON

With vendors continuously matching one another on a feature-by-feature basis, it is increasingly difficult to tell one relational database management system server package apart from another.

While product parity reduces the chance of making a bad purchasing decision, the selection process is anything but a cakewalk. Just when users are ready to go with one vendor that has certain advanced features, competitors roll out the same enhancement, which complicates the final decision.

It goes on all the time. For example, when Sybase, Inc. introduced stored procedures in the first release of SQL Server, it didn't take long for Oracle Corp. to put that feature into Oracle7, which was available after SQL Server. While Borland International, Inc. was first out with event alerters in its InterBase product, the feature didn't catch on until The ASK Group, Inc. added it in what is now the Ask-OpenIngres/Intelligent Database. And soon most vendors incorporated event alerters. Informix Software, Inc. introduced support for Binary Large Objects (BLOB) — or unstructured data — and soon a flood of vendors began supporting BLOBs.

And so it goes, even with performance claims. As soon as one vendor heralds a benchmark test showing that its product performs best, its competitors offer different benchmark results that put them at the top of the best performer list.

The advent of client/server computing makes the choice of a strategic relational DBMS server even trickier because users must decide how they will take advantage of the ability to break processing chores apart and run them on clients and servers.

Users should weigh how different relational DBMS servers permit them to split important functions between the client and server. This type of comparison is more important than the features a given product may provide. It is also important to examine the type of tools relational DBMSs offer for optimizing database processing as well as how easily data can be distributed across multiple servers.

Users that focus on client application functionality may find that the selection of a relational DBMS server is already made for them. Some vendors are bundling client applications and relational DBMS servers together, which is forcing some users to support multiple relational DBMS servers.

Zale Corp. is such a company. The firm enables departments to select applications that dictate the choice of a relational DBMS server even though it has chosen Sybase as its strategic vendor. "We want to be applications-driven, not relational DBMS-driven," says Tom Carson, Zale's director of distributed systems in Irving, Texas. "So we will implement any relational DBMS required to support an application chosen by our users."

For example, Zale's accounting group last year replaced a custom mainframe general ledger application with a prepackaged application from Oracle that required use of Oracle7. Yet Zale continues to standardize on Sybase's SQL Server whenever an application supports it because Zale's developers fell in love with that product's ease of use, Carson says.

There are also more relational DBMS servers hitting the market. For example, Microsoft Corp. recently announced a Windows NT version of its Microsoft SQL Server. With this new offering, Microsoft is positioning Windows NT as a direct competitor to Unix as the operating system of choice for relational DBMS servers, a strategy that will effectively force users to make an operating system and relational DBMS server decision concurrently.

In addition, Microsoft is essentially parting ways with Sybase. Under a strategic partnership, Sybase licensed the heart of its SQL Server to Microsoft, which then developed its own version of that product. The two companies are now going in different directions with their future SQL Server products. This just adds more confusion to an already confusing picture.

IBM has also made recent strategic moves in the relational DBMS server market. The firm rolled out DB2/6000, a version of its popular host-based DB2 that runs under Unix on IBM's RISC System/6000 platform. IBM announced it will port DB2/6000 to other Unix-based platforms and possibly even to Windows NT, a dramatic departure from its past strategy of sticking to IBM platforms only. Users who have held IBM databases as the data center standard now have the option of retaining IBM technology while implementing new architectures.

And other vendors just keep rolling out new versions and features. Oracle, for example, introduced a version of Oracle7 that will run on massively parallel systems, as well as a multimedia database tool that will support interactive video.

MARKET LOW DOWN

Clearly, there is a lot to choose from on the market today. Users downsizing from mainframe environments don't want to have to make compromises in selecting a relational DBMS server.

"[We want] the same degree of robustness we've become accustomed to in our mainframe databases," says Jonathan Markow, project leader at Columbia University's Administrative Information Services. "All of the same fail-safe features, like commit, rollback, checkpoint, restart and restore, have to be available for any serious downsizing development."

A lot of those capabilities are found in high-end products, such as Computer Associates International, Inc.'s family of CA-IDMS and CA-Datacom products, IBM's MVS-based DB2, Oracle's Oracle7

Continued on page 53

NETWORK WORLD SHORT LIST 1994

Relational DBMS servers

- ✓ **Informix Software, Inc.** *Informix-OnLine 7.0*
- ✓ **Microsoft Corp.** *Microsoft SQL Server 4.2X*
- ✓ **Oracle Corp.** *Oracle7 7.0*
- ✓ **Sybase, Inc.** *SQL Server 10*

Complete details about The Short List appear on page 57.

inside

- **Opening up the gates to data. Page 55.**
- **Users lay out their top relational DBMS server selection criteria, divulge application development plans in our reader views. Page 56.**
- **Get the lowdown on the key capabilities of 22 products from 19 vendors in our Buyer's Guide chart. Page 57.**
- **Learn about three ways to pump tasks through the relational DBMS engine. Page 58.**

Continued from page 52

7.0, Software AG's Adabas 5.3.2 and Sybase's SQL Server 10. These products support very large databases, typically in the range of a hundred gigabytes to over a terabyte. They also support thousands of users and meet the most demanding performance requirements.

High-end products are typically designed to make optimum use of system resources that enable them to provide maximum scalability. They also run on multiprocessor architectures, address large amounts of memory that can exceed 512M bytes and support databases that span many physical disks.

Products in this segment have a broad feature set, including support for two-phase commit, data replication, stored procedures, triggers, on-line backup and typically lead the industry in the introduction of new features. They support high throughput on-line transaction processing (OLTP) applications with the utmost in data integrity and are often used for banking, financial, order processing, inventory and distribution system applications within Fortune 500 companies.

In the mid-range are such products as The ASK Group's AskOpenIngres/Intelligent Database, Borland's InterBase 3.3, Hewlett-Packard Co.'s HP ALLbase/SQL 6.0, IBM's RS/6000-based version of DB2, Informix's Informix-OnLine 7.0, Microsoft's Microsoft SQL Server 4.2X and Progress Software Corp.'s Progress 7.

These products support databases that range up to a few hundred gigabytes and several hundred users. Their architectures can support multiprocessing and are used in smaller companies or departments of larger firms. They may be used for OLTP, but the transaction rates are likely to be lower than their high-end counterparts, and they scale to the highest end processors.

At the low end are such products as Btrieve Technologies, Inc.'s NetWare SQL 3.0, Gupta Corp.'s Gupta SQLBase Server 5.1.4 and Watcom International Corp.'s Watcom SQL Network Server 3.2. These products are typically used for workgroups or small departments. They usually run on single-processor systems, support less than 100 users and databases that are less than 1G byte in size.

A wolf in sheep's clothing

Unlike true client/server databases, multiuser databases merely store files on the server and require the client to perform all processing. Product examples include Lotus' Approach, Microsoft's Access and Foxpro, and Borland's Paradox and dBase. These products can be used, however, as front ends to real database servers.

There are three key factors to consider when evaluating relational DBMS server products: the client/server architecture they will be deployed in, how important features are implemented and the level of distributed DBMS support provided.

FITTING CLIENT/SERVER MODEL

The term client/server is so overused today that it has ceased to have a precise meaning. Client/server is simply a model for building information systems (IS) that are organized into discrete components deployed at different locations on local- and wide-area networks.

There are two dimensions to client/server architectures. One defines the clients, servers and networks used to build client/server applications. The other defines the internal architectures of the elements used in the client/server environment — the internal workings of a relational DBMS server, for example.

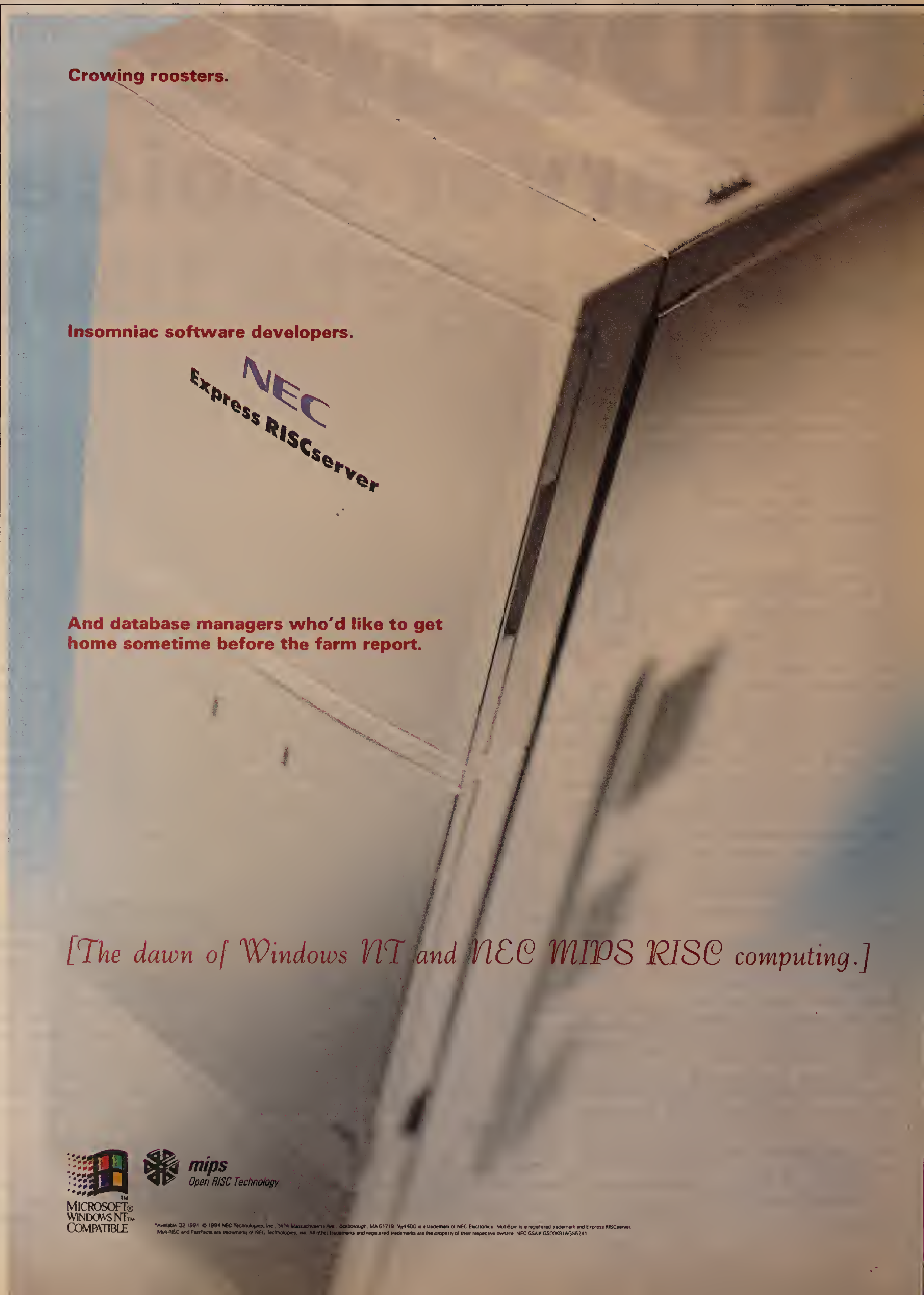
Each dimension plays a role in selecting a relational DBMS server, although the application architecture will likely have already been defined before the purchase decision is made.

The original concept of client/server embraced a two-tiered model with desktop clients — usually personal computers — on one tier and servers — often Unix relational DBMS servers — on the other. To build applications in this two-tiered model, users have to decide whether presentation, application logic and data management functions should reside on the client or server.

The decision is easy for two of the three. Presentation, such as a graphical user interface (GUI), is the province of the client, while data management is the server's domain. Making the third decision — where to put the application logic — poses a problem.

If application logic is placed on the client, the server is freed from processing that task; thus, the application should perform faster. But then the problem arises of how to ensure that business rules defining a company's policies and procedures for completing business tasks are enforced and that client applications are up-to-date. On the other hand, placing application logic on the server can be a step back to traditional monolithic applications that are difficult to change and extend.

Current thinking is that a three-tier model, similar to the ANSI 3 schema database model,


Crowing roosters.
Insomniac software developers.
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is a more flexible way to approach client/server architectures. This model has a physical storage and management layer and an external presentation layer. Between these layers lies a representation of the physical data based on the logical model of information that users require to do their jobs. This middle layer translates the complexities of the relational model to concepts that end users can understand.

The middle layer has application program interfaces (API) that translate between what the user wants to get done and how it gets done in the physical database. Business rules might be enforced in the middle layer or at the back-end server, but this decision is very application-specific.

The advantage of a three-tier approach is that the implementation of the physical layer may change without affecting the developer's or user's view of the data. This is not always the case when the traditional two-tier client/server model is used because the client application is more likely to use database-specific syntax, semantics and features that are not transferable to other products.

Aside from choosing a client/server model, there are also issues of how a client application can access data on disparate databases. This can be done using gateways, APIs, such as Microsoft's Open Database Connectivity (ODBC), or even such tools as the SQL Access Group's Call-Level Interface, which provide some translation functions. These functions can be done on the client, the server or a combination of the two (see story, page 55).

Both these models can be implemented with any relational DBMS server product. The selection of a specific product hinges on how large the database is and how many users will be supported. It is possible to have a two-tier architecture that requires a high-end server if there are hundreds of users and a terabyte of data, or low-end server if there are hundreds of megabytes of data and only a dozen users.

Architectures for the internal workings of relational DBMS server products have been evolving over time (see story, page 58). Early relational DBMS servers, such as Informix's Informix-OnLine 5.01, Oracle's Oracle6, Borland's InterBase 3.3 and Sybase's SQL Server 4.8, required each client to communicate with dedicated server processes.

Vendors then developed a multiserver, multithreaded architecture that enables groups of clients to dump requests for database processing into a queue and have those requests distributed to the next available server process for completion. The multiserver, multithreaded architecture was first available in Ingres' Intelligent Database 6.4, which was subsequently acquired by The ASK Group, and Progress' Progress 6. It is now used in Informix's Informix-OnLine 7.0, Oracle's Oracle7 with multithreading option and Sybase's Virtual Server Architecture.

AT THE CORE

Overall, most relational DBMS servers have similar high-level features, differing only in minute details of implementation. The absence of any key feature, however, is extremely important.

How well a relational DBMS server performs is one of its most important features, particularly as the size of the database increases and more users access it. Among the methods for providing top-notch performance are various indexing schemes and query optimization techniques.

Indexing methods include hashed indexes and clustered indexing. These methods are designed to provide faster access to data. For example, hashed indexes use mathematical transformations of an actual key data-field value to point to records in the database. Clustered indexes sort rows of data on an ongoing basis so their physical order on a disk is the same as their logical order in the index. Products that support more methods provide greater flexibility in creating indexes that will optimize database performance.

Query optimization is a somewhat esoteric technology. A query optimizer uses special algorithms to determine the optimum method for retrieving data, developing an execution plan and then carrying out that plan. The relational DBMS server should be able to compile and save the plans for executing frequently repeated queries.

A query optimizer is among the most important and proprietary of a relational DBMS server vendor's technologies and one that contributes significantly to performance. Methods of query optimization include cost-based, rules-based and table statistics.

Cost-based optimization looks at different

Continued on page 55

Calling all...

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Network World invites you to participate in a product survey for an upcoming Buyer's Guide on routers. If you'd like to receive a survey form, please call (800) 622-1108, Ext. 461 and leave a message for Cheri Paquet, assistant editor, or Barbara Wierzbicki, Buyer's Guide editor. Be sure to include your voice and fax numbers when requesting a product survey. Vendors must contact *NW* no later than June 3 to receive a survey form.

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Continued from page 54

methods of getting the requested data and evaluates such factors as the type of indexes that are available, how much data must be moved across the network, the CPU cycles required to complete the query and available CPU cycles. It will then choose the method with the lowest overall resource requirement. A cost-based optimizer that uses table statistics is the most sophisticated approach.

Rules-based optimization uses a more theoretical approach to optimizing queries. Optimizers that use table statistics actually consider how many rows and columns are in a table, how many bytes are in each row and other statistics to develop a plan for completing the query.

Many relational DBMS servers have an "Explain" capability that shows the database administrator how a query will be executed. Explain may show a graphical picture of how different data tables will be joined and which keys will be used to join the tables. The database administrator can use this explanation to manually tune large, time-consuming or repetitive queries.

Sybase and Oracle support the most methods of optimization. Btrieve and Empress Software, Inc. only support optimization-based query syntax and rules.

Just as performance is an issue in determining how quickly client requests are processed, referential integrity features are important for keeping data that is shared across a set of related records updated. Referential integrity becomes more important as the number of different client applications capable of updating the data grows.

Referential integrity maintains consistency in related data stored in different tables. A record in one table that may contain customer information can have related records in an order table stored elsewhere. If the customer record is deleted, the order records also have to be deleted or they will be orphans. Likewise, if the customer information is changed, the order table must also be changed.

One method of maintaining referential integrity is to use triggers, actions that the database carries out automatically in response to an insert, update or delete event. Triggers may be executed on the client or server. In some cases, triggers can be executed across multiple nodes on the network.

The advantages of executing triggers on the server is that they are easier to maintain and they insure that all applications abide by their requirements. When executed on the client, performance improves but integrity is more difficult to maintain.

Client-side referential integrity is less desirable because there is no way to guarantee that all client applications are imposing the same trigger or are running the current trigger version. Between the two approaches, server-side triggers are preferable because of the control they offer to insure that referential integrity is being enforced.

Most vendors support server triggers, but Progress' Progress 7 provides the option of executing triggers on the client or server. About the only differences in how triggers are implemented are in the number of triggers supported and whether those triggers can execute before or after a record is updated. There are no standards for triggers, and they are not portable from one product to another.

In addition to triggers, referential integrity can be maintained through declarative statements, an ANSI SQL standard that calls for a means of enforcing referential integrity through primary and foreign keys and SQL statements. Oracle, IBM with its DB2/2, Gupta, Watcom and XDB Systems, Inc. are among the vendors with declarative statements.

Another important feature to examine is stored procedures, code that allows business rules and other application logic to be maintained in the database. Stored procedures may be written in third-generation languages, as is the case with IBM's DB2/6000, or fourth-generation languages, as is the case with Sybase and Oracle.

Stored procedures can perform many different operations and can be executed on the client or server. For example, a stored procedure in an order entry application can be used to check a customer's account balance maintained in another application before accepting an order. A stored procedure in a transaction processing application can check a credit limit maintained in an accounting application before committing a transaction.

Execution of stored procedures on the server is more common because it allows for centralized maintenance and control. Any stored procedure is suitable for the server. However, this can often lead to applications that are almost as monolithic as traditionally designed ones.

Execution on the client allows flexibility but at the expense of possible inconsistencies when applying business rules. Client-side stored procedures are ones that are most directly related to an action a user may perform, such as entering or editing data.

Today, each product has different semantics and syntax for invoking stored procedures and different server implementations preventing portability of stored procedures across products. Efforts are under way to standardize syntax and semantics, such that a client's application code does not have to be modified to invoke a stored procedure on different servers. That effort may bear fruit next year.

Another important feature is event alerters that enable the database to execute code or a stored procedure in response to some change. They are more general than triggers, and the event might be based on a calculation, update or attempt to delete data.

The event alerter can provide real-time notification to an application that a particular event has occurred. This way, an application doesn't have to constantly poll the database to see if a parameter has changed, thus avoiding the performance burden that polling places on the network, server and client.

For example, an event alerter might go off if the inventory level of a particular product went below a certain level. A notification could be sent to an application that could automatically place an order for more of that product from the supplier.

Access to electronic mail APIs, such as the ones Microsoft has implemented in its SQL Server, expand event alerter notification options. For instance, an event alerter cannot only order more product, but also send an E-mail message that informs the person in charge of tracking inventory that the order was placed.

Having event alerters in a relational DBMS server adds to the flexibility a developer has in designing applications. However, like stored procedures, these are not portable today across databases from different vendors.

Borland was the first to implement event alerters. The ASK Group was next, followed by Digital Equipment Corp., Gupta, Oracle, Progress, Sybase and UniSQL, Inc.

In a multiuser environment, the need to maintain the integrity of data so that two users cannot change the same row or field simultaneously has to be balanced against performance requirements. Relational DBMS servers use different combinations of data-locking levels, lock types and data isolation to prevent changes being made concurrently; to keep two users from locking each other out of the database, in what is called a deadly embrace; and to keep to a minimum the time spent waiting for a record to be unlocked.

A database can be locked at different levels, ranging from a page level that is typically measured in 2,000 bytes a page to the field level. The finer grain the lock is, the less likely users are to be prevented from updating particular data.

Most products lock at the page and table levels. Only Sybase, Microsoft, Gupta, HP in its HP Image/SQL 6.0 and IBM in its MVS-based DB2 don't support row locks.

Field-level locking is difficult to implement, and only a few vendors (Borland, Software AG, Empress and Digital) implement it today.

Tools for managing relational DBMS servers are an area in which most products are weak today. Managing multiple distributed relational DBMS servers with hundreds of clients making requests and updates can be very difficult and often requires logging on to each individual server. While this can usually be done remotely, it means individually adminis-

Gateways open up data access

One factor to consider when evaluating relational database management systems is the access they provide to other relational DBMSs via gateway software.

Most gateways provide read/write access to a single remote data source, typically a host-based system such as IBM's IMS or DB2. Most gateways enable users to perform cross-database joins and some support cross-database updates. In addition, leading vendors are beginning to offer connectivity to the relational DBMSs of their direct competitors in an effort to provide interoperability.

The biggest advantage of DBMS gateways is that they give developers a single, consistent platform for accessing multiple, disparate DBMSs.

Developers can write client programs that access multiple remote DBMSs using one vendor's set of database calls and SQL semantics. The gateway does all necessary translations to the target DBMS's database calls and SQL semantics on-the-fly.

The company that provides the highest level of DBMS interoperability now is Sybase, Inc., which has individual gateways that establish a point-to-point link from its SQL Server 10 to most relational DBMSs, including IBM's MVS mainframe databases and those from archrivals Oracle Corp. and Informix Software, Inc.

Sybase also has gone a step beyond providing point-to-point gateways with its OmniSQL Gateway, which supports distributed joins and updates across a half-dozen Unix and legacy databases. Sybase has further strengthened its gateway portfolio with the recent acquisition of Micro Decisionware, Inc., a leading provider of point-to-point gateways that will now be folded into Sybase's OmniSQL Gateway.

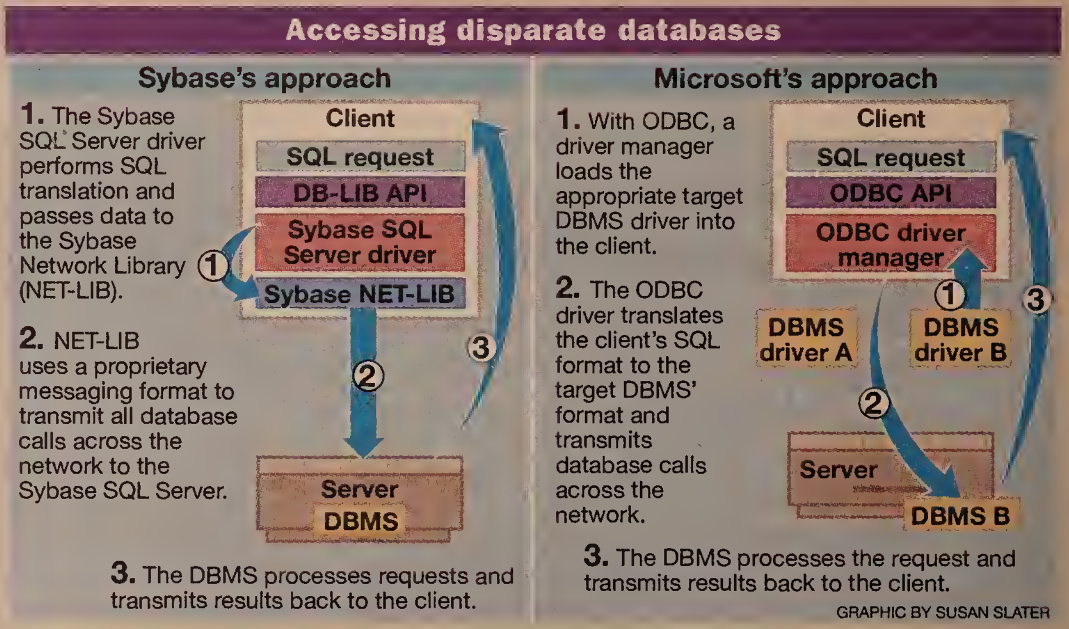
Sybase is also the first vendor to publish front- and back-end interfaces to its relational DBMS. Called Open Client and Open Server, the interfaces essentially let users build their own DBMS gateways.

However, gateways aren't a cure-all. If users aren't careful, a gateway can lock them into using a single vendor's client application development tools, relational DBMS engine, server platform and network connectivity software. Gateways are also costly and provide only lowest common denominator functionality.

To avoid these problems, many users are deploying other methods to achieve DBMS interoperability, such as database application program interfaces (API) and industry-standard database protocols. Database APIs, such as Microsoft Corp.'s Open Database Connectivity and Sybase, Inc.'s Database Library, provide developers with a common set of function calls for accessing heterogeneous data sources, but there are some slight differences in their implementation (see graphic).

Database protocols, such as IBM's Distributed Relational Database Architecture and the ISO Remote Database Access that is part of the SQL Access Group's Formats and Protocols, define a common SQL grammar, data format and network protocol for applications to communicate with disparate DBMSs.

W. Eckerson



Accessing disparate databases

Sybase's approach

1. The Sybase SQL Server driver performs SQL translation and passes data to the Sybase Network Library (NET-LIB).

2. NET-LIB uses a proprietary messaging format to transmit all database calls across the network to the Sybase SQL Server.

3. The DBMS processes requests and transmits results back to the client.

Microsoft's approach

1. With ODBC, a driver manager loads the appropriate target DBMS driver into the client.

2. The ODBC driver translates the client's SQL format to the target DBMS' format and transmits database calls across the network.

3. The DBMS processes the request and transmits results back to the client.

GRAPHIC BY SUSAN SLATER

tering each server instead of as a group or domain of servers.

What users require is the ability to manage multiple servers in a consistent, integrated fashion, ideally with a GUI. While there are third-party products now appearing that provide this functionality, the Windows NT-based version of Microsoft's Microsoft SQL Server provides one of the most graphical and integrated ways to manage distributed servers.

DISTRIBUTED DATABASES

One of the new battlegrounds for relational DBMS servers is the area of distributed database management. During the past two years, most vendors have added or announced support for distributed capabilities, such as distributed query processing, two-phase commit and data replication.

The key limitation in building a distributed database is the network. Trying to update or query data across a WAN will result in slow response times, especially if users are accessing large volumes of data in multiple remote sites. Also, network links can fail, preventing users from accessing remote data and potentially undermining the integrity of distributed updates.

There are two basic strategies for building and maintaining distributed databases: two-phase commit and data replication. Each addresses the limitations imposed by networks differently. Two-phase commit emphasizes data integrity at the expense of performance, while replication emphasizes reliability at the expense of timeliness.

Two-phase commit coordinates transactions across multiple relational DBMS servers in real time. The protocol ensures that every database is updated. If one database is not ready to participate in the transaction because

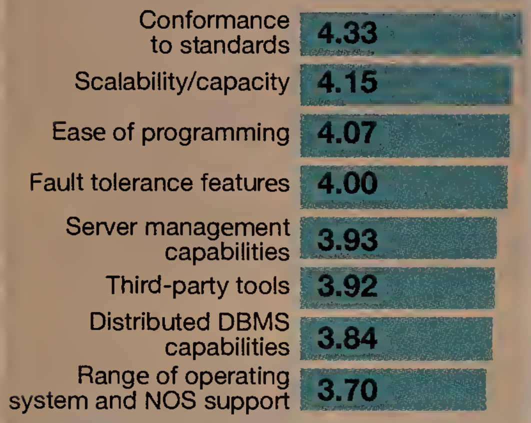
Continued on page 58

Reader views on relational DBMS servers

Based on 100 interviews.

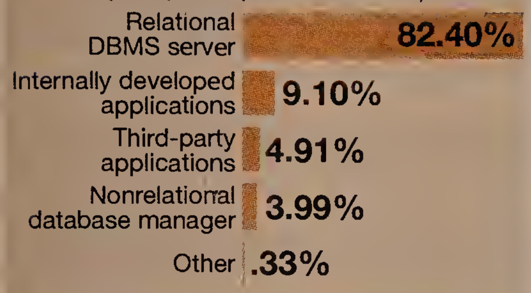
Relational DBMS selection criteria

(Based on highest possible score of 5.)

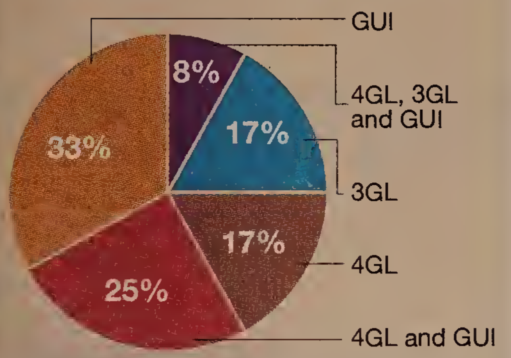


Where do/will your client/server applications run?

(Multiple responses allowed.)

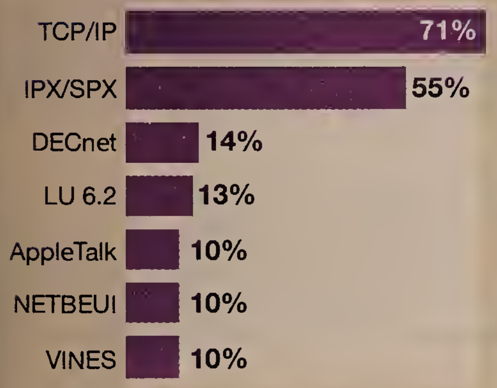


What development tools do you use/plan to use to develop relational DBMS client/server applications?

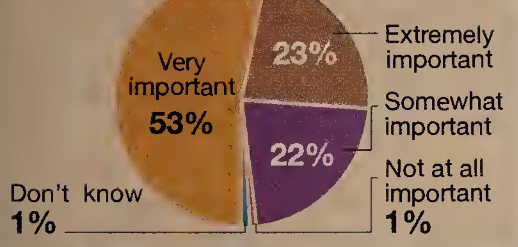


What network transports do/will you use?

(Multiple responses allowed.)



How important would a standardized client API be to your company?



Focus Data, Inc., an independent market research firm in Framingham, Mass., conducted the survey. Focus Data specializes in gathering primary data from end-user organizations regarding their enterprise network environment and needs. For more information on Focus Data services, call Mona Dabbon at (508) 626-2556.

GRAPHIC BY SUSAN SLATER

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Relational DBMS servers

Company	Product	Server platform							Communications protocol								SQL precompilers	Call-level interfaces	Advanced data types	Features			Referential integrity	Distributed features						Price
		MVS	NLM	OS/2	Unix	VMS	Windows NT	Other	AppleTalk	DECnet	IPX	NETBEUI	LU 6.2	TCP/IP	VINES	X.25	A = Ada C = C C+ = C++ CO = COBOL F = FORTRAN P = PASCAL	D = DAL O = ODBC P = Proprietary S = SAG/CLI	A = Arrays B = BLOB L = Logical U = User-defined	Event alerter	Performance monitoring	Incremental backup	A = Across nodes D = Declarative statements P = Procedural T = Triggers	Replication	Two-phase commit	Distributed queries	Distributed updates	DRDA	X/Open XTM	
The ASK Group, Inc. (800) 446-4737	AskOpenIngres/ Intelligent Database	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	A, C, C+, CO, F, P	O, S	A, B, L, U	✓	✓	✓	D, P, T	✓	✓	✓	✓	✓	✓	$1,000-$384,000
Borland International, Inc. (800) 458-7730	InterBase 3.3				✓	✓		✓						✓			A, C, C+, CO, F, P	O, P	A, B	✓			P, T		✓		✓	✓		$795-$350,000
Btrieve Technologies, Inc. (800) 287-4383	NetWare SQL 3.0		✓						✓		✓	✓					C, C+	D, P	L, U		✓		D			✓	✓			$795-$10,995
Cincom Systems, Inc. (800) 543-3010	Supra Server	✓	(1)	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓		A, C, CO, F, P	O, P	B		✓	✓	A, D, P		✓	✓	✓			$2,000-$150,000
Computer Associates International, Inc. (800) 225-5224	CA-Datacom, CA-IDMS product families	✓	(1)		✓			✓					✓	✓			C, CO	O, P	A		✓		D		✓	✓	✓			$10,000-$215,000
Digital Equipment Corp. (800) 344-4825	AccessWorks				✓	✓	✓		✓	✓	✓	✓	✓	✓			C, CO, P	D, O, P, S	A, B, U	✓	✓	✓	A, D, P, T	✓	✓	✓	✓		✓	$9,000+
Empress Software, Inc. (301) 220-1919	Empress RDBMS 6.2				✓	✓		✓						✓			A, C, F	P	B, U		✓		A, D		✓	✓	✓			$1,600-$320,000
Gupta Corp. (800) 876-3267	Gupta SQLBase Server 5.1.4		✓	✓	✓			✓			✓			✓	✓		C, C+, CO	O, P	B	✓	✓	✓	D					✓		$400-$9,995
Hewlett-Packard Co. (800) 637-7740 Ext. 8379	HP ALLbase/ SQL 6.0				✓			✓			(2)			✓			A, C, CO, F, P	O, P	B	✓	✓	✓	D, P, T	✓		✓	✓			$2,295-$126,000
	HP Image/SQL 6.0							✓			✓			✓			C, CO, F, P	O, P			✓	✓	D, T							$5,252-$160,160
IBM (800) 426-2255	DB2 product family	✓		✓	✓			✓			✓		✓	✓			C, CO, F	D, O, S	B		✓	(3)	D	✓	(3)	(3)	(3)	✓	✓	$425-$502,550
Informix Software, Inc. (800) 331-1763	Informix-OnLine 7.0				✓						✓			✓			A, C, CO, F	O, P	B		✓	✓	D, P, T	✓	✓	✓	✓	✓	✓	$5,625+
	Informix-SE 6.0			✓	✓		✓				✓			✓			A, C, CO, F	O, P					D, P, T							$1,250+
Microsoft Corp. (800) 426-9400	Microsoft SQL Server 4.2X			✓			✓				✓	✓		✓	✓		CO	O, P, S	A, B, L, U	✓	✓	✓	P, T		✓		✓	✓		$995-$19,995
Oracle Corp. (800) 345-3267	Oracle7 7.0	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	A, C, CO, F, P	O, P	B	✓	✓		A, D, P, T	✓	✓	✓	✓	✓	✓	$995-$614,000
Progress Software Corp. (617) 280-4700	Progress 7		✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓		✓	C	O, P	A, L	✓	✓	✓	A, D, P, T		✓	✓	✓		✓	$2,900
Software AG (703) 860-5050	Adabas 5.3.2	✓		✓	✓	✓		✓		✓	✓	✓	✓	✓		✓	C, CO	O, P, S	A		✓	✓	A, P	✓	✓	✓	✓			$1,700-$98,900
Sybase, Inc. (800) 879-2273	SQL Server 10				✓	✓		✓		✓	✓			✓	✓		A, C, C+, CO	O, P	B, U	✓	✓	✓	D, P, T	✓	✓	✓	✓	✓	✓	$3,750-$92,760
UniSQL, Inc. (800) 451-3267	UniSQL/X Database Management System 2.0				✓									✓			C, C+	O, P, S	A, B, L, U	✓	✓		A, P, T		✓	✓	✓			$3,995-$150,000
Watcom International Corp. (800) 265-4555	Watcom SQL Network Server 3.2		✓	✓				✓			✓	✓					C, C+	O	B		✓	✓	D		✓					$795-$4,995
XDB Systems, Inc. (800) 488-4948	XDB-Server 4.0			✓			✓	✓			✓	✓		✓			C, CO	O, P	B		✓		D					✓		$2,495-$20,000

Products highlighted by color were selected for The Short List.

FOOTNOTES:
(1) Runs in a NetWare environment, but not as an NLM
(2) Supported via proprietary MPE/iX.
(3) Available for MVS.

BLOB = Binary Large Objects
DAL = Data Access Language
DRDA = Distributed Relational Database Architecture
NETBEUI = NETBIOS Extended User Interface
NLM = NetWare Loadable Module
ODBC = Open Database Connectivity
SAG/CLI = SQL Access Group/Call-Level Interface
XTM = X/Open Transactional Model

Relational DBMS servers

The Short List highlights products Network World *recommends you examine during the purchasing process for relational database management system servers. Products included on The Short List meet the buying criteria outlined in the Buyer's Guide and, in some cases, offer additional useful features. Those criteria reflect the needs of users with multivendor enterprise networks. Your criteria may differ.*

■ Informix Software, Inc.

Informix-OnLine 7.0

Informix blazed the trail in bringing relational DBMS servers to Unix-based open system environments and continues to build on its innovation. Informix overcame some of Unix's shortcomings by taking over such chores as file management from the operating system, thus making Unix suitable for heavy-duty transaction processing.

Support for a multiserver, multithreaded architecture improves Informix-OnLine 7.0's performance and scalability by enabling it to easily process multiple client requests at once. Delivery of a promised full-parallel query processing feature will further improve performance by processing different parts of a complex ad hoc query simultaneously. The product also supports such high-end features as data replication that keeps distributed databases synchronized and Binary Large Objects that store unstructured data files of up to 2G bytes each.

■ Microsoft Corp.

Microsoft SQL Server 4.2X

Users give rave reviews for this product's strong price/performance, its integration with Windows NT, strong Windows-based DBMS administration tools and interoperability with Sybase, Inc.'s SQL Server. SQL Server 4.2X is sold as a shrink-wrapped package in keeping with Microsoft's strategy of providing modular software that can work together. With support for Windows NT's application program interfaces (API), the package can tap Windows NT-based tools. Microsoft also gets a plus for its Open Database Connectivity API, which enables clients to reach disparate relational DBMS servers.

■ Oracle Corp.

Oracle7 7.0

Oracle7 has advanced technology in a few areas and performs well across the broadest range of processing platforms. For instance, Oracle has pushed into the arena of running databases on massively parallel systems and is supporting storage of such new data types as video, which paves the way for it to support interactive multimedia applications.

Oracle is also developing shrink-wrapped applications that are tightly integrated with its relational DBMS server, thus offloading the application development chore from users.

■ Sybase, Inc.

SQL Server 10

As the company that pioneered DBMSs, Sybase provides a strong product that supports on-line processing and decision support applications. With its Open Client and Open Server APIs, Sybase continues to strengthen its position in client/server environments. Open Client and Open Server make it possible for a host of third-party application development tools and relational DBMS servers to work together.

Sybase's Replication Server add-on module keeps distributed databases synchronized, while its Navigation Server that runs on massively parallel and symmetric multiprocessing platforms beefs up SQL Server's ability to support large mainframe-sized databases.

Continued from page 56

it is off-line or the network has crashed, two-phase commit rolls back the transaction in all the other databases and starts the process again.

However, two-phase commit imposes a significant performance penalty. The protocol creates a lot of network overhead since each of the databases participating in a transaction must constantly communicate with one another. Also, two-phase commit operations often result in aborted transactions, which forces users to try completing the transaction again, thus taking up even more network capacity.

Most vendors listed in the Buyer's Guide chart on page 57 now support two-phase commit, with the only major exceptions being Gupta and HP in its HP ALLbase/SQL 6.0. IBM supports two-phase commit only in its MVS-based and AS/400 versions of DB2.

Two-phase commit is helpful when distributed data used in financial and airline reservation system applications must be kept synchronized in real time at all costs.

Cincom Systems, Inc. recently introduced a new type of two-phase commit that provides better performance and higher availability of database resources. The latest version of its Supra Server supports a two-phase commit protocol called Transaction Partners that lets applications complete a transaction even if one or more databases are unavailable. The Transaction Partners protocol uses an optimistic roll-forward mechanism to coordinate updates among multiple databases, whereas most two-phase commit protocols employ a pessimistic, roll-back method.

In the Transaction Partners protocol, each database participating in an update stores information about the update in a log. If a database fails in the middle of an update, that database, upon recovery, will check other databases that participated in the transaction to see if any completed the update. If it finds one database that successfully executed the transaction, it then completes the update.

To get around some of the performance problems associated with two-phase commit, vendors have embedded replication facilities in their products or offer replication add-on modules.

Unlike two-phase commit, replication isn't very vulnerable to network or machine outages. With replication, copies of updates are distributed to one or more remote databases. Updates can be replicated from a master database to multiple remote databases or vice versa. Users can also specify the time intervals for replication to occur, such as every 30 seconds or once a day.

Users are deploying replication to create backup copies of their databases and consolidate reporting information from branch offices to a central site. Some are also using replication to create information warehouses for decision support purposes as well as to coordinate updates between legacy and downsized applications.

In reality, replication is not a new capability. Users have written replication utilities for many years to solve numerous in-house requirements. However, users are more than happy to turn such development work over to vendors that can offer such utilities less expensively and provide support and maintenance, as well.

Last year, Software AG became one of the first vendors to ship replication capabilities. It has been followed by a host of others, including The ASK Group, Digital, HP, IBM, Informix, Oracle and Sybase.

However, users should realize that not all vendors have taken the same approach to replication. Sybase, for example, provides Replication Server as an add-on option to SQL Server 10. Also, the company's Replication Server supports asynchronous replication. That is, it distributes or replicates individual transactions from a primary database to one or more remote databases using a store-and-forward mechanism.

Replication Server captures transactions in a log at the central site and then delivers them when the remote servers are available. However, the recipient databases are read-only and can't be updated directly by local users. Users at the remote sites can update replicated data by executing a stored procedure against the primary database, which then replicates the changes back to the remote site.

Oracle's Oracle7 relational database, on the other hand, supports synchronous replication in which entire database tables, not individual transactions, are replicated. Also known as table-driven replication, this feature takes snapshots of the database, and it lets users replicate a table in a master database to a table in one or more remote databases. It also lets users replicate multiple tables in a master database to a single table in remote databases. Unlike users of Sybase's Replication Server, Oracle users can schedule the intervals at which replication will take place.

The service and support provided by a vendor may ultimately become one of its primary distinguishing characteristics. Hyatt Hotel Corp. chose to implement Informix's Informix-OnLine relational DBMS server several years ago because of its front-end tools and the support level Informix was willing to provide in helping Hyatt move all its applications from a mainframe to Pyramid Technology Corp. multiprocessing Unix machines.

Informix provided a half-dozen programmers to help Hyatt's staff rewrite several old COBOL and Assembler programs using the Informix fourth-generation language. Informix's staff also helped Hyatt tune the performance of the Informix relational DBMS server on the Pyramid multiprocessors.

"Establishing a strong partnership with Informix was a big reason for our downsizing success," says Gordon Kerr, director of IS at Hyatt in Oak Brook Terrace, Ill.

THE BOTTOM LINE

The most critical step in selecting a relational DBMS server is to thoroughly understand your application requirements first. Selecting the relational DBMS server first can seriously constrain development, restrict functionality and impact performance.

However, widespread support of such standards as ODBC that provide access to disparate databases as well as portable stored procedures will make it easier to swap out relational DBMS servers as the need arises. Nevertheless, client/server applications are difficult to build and deploy, and selecting an inappropriate server can sink a project before it even starts. Prototyping and benchmarking are critical steps to ensure overall success.

While today's products have similar feature sets, the application of relational DBMS servers in new areas will require additional features. For example, Rick Fortin, vice president of information services at Label Art, Inc. in Wilton, N.H., says a critical factor for relational DBMS servers is that they support nested or post-relational capabilities. That is, relational DBMS servers should provide support for multiple entries within a single field, such as two or three telephone numbers.

This runs contrary to relational DBMS server theory, which requires database administrators to normalize data as much as possible. However, nested relational databases are more practical because they represent the real world more accurately, Fortin says.

Looking further into the future, emerging object-oriented DBMSs (OODBMS) will challenge relational DBMS servers as the next wave of technology for certain applications using complex data types. Fitted with SQL interfaces, these technologies are maturing in products that will challenge relational DBMS servers in some areas. Already, OODBMS vendors are calling relational products the legacy systems of tomorrow.

➡ Goulde is editor in chief of the "Unix in the Office" newsletter, and Eckerson is senior editor of the "Open Information Systems" newsletter at Patricia Seybold Group, Inc., a Boston-based research and consulting firm. They can be reached at (617) 742-5200.

Architectural designs

When selecting a relational database management system server, users need to brush up on three basic architectures that determine how well a product will perform in a client/server environment.

Relational DBMSs are second in complexity to operating systems. In fact, relational DBMSs sometimes perform operating system functions in order to optimize performance.

The architectures of relational DBMS servers have evolved over the past five years to address the high degree of unpredictability in client/server environments. Requests for services from clients are received at unpredictable intervals, in unpredictable volume and can contain complex ad hoc SQL queries capable of bringing the system to a grinding halt.

Each of the architectures runs on top of a multitasking operating system. The multiserver, single-threaded architecture is the oldest and most basic. In this architecture, clients pass processing requests to one of many logical servers, which spawn a process that remains active until the request has been serviced.

The multiserver, single-threaded architecture can run on a single- or multiple-processor system but is relatively inefficient in its use of system resources, including CPU cycles and memory. This is because servers are single-threaded, meaning they must wait for a process to be completed before they can start another one. Therefore, this architecture does not scale very well in terms of the number of client processes that can be served at any one time or in terms of the number of transactions that can be processed at once.

A multiserver, multithreaded architecture with a shared queue is the next step up the relational DBMS server architecture ladder. With this architecture, the relational DBMS can be set up to start as many server processes as needed, as long as they remain within the limits of the system configuration.

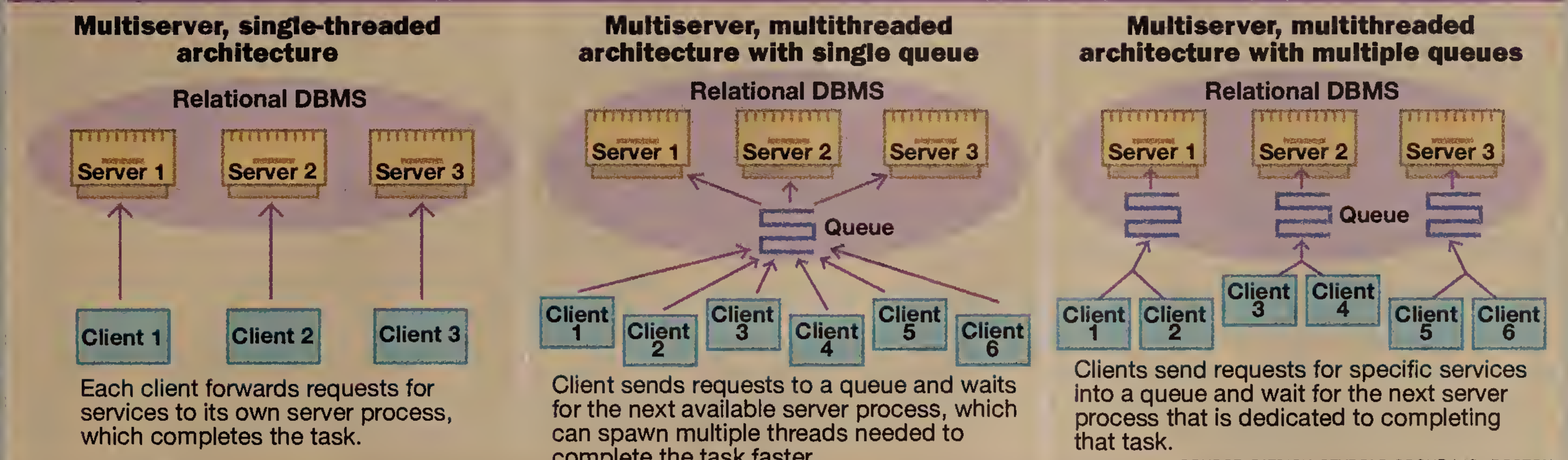
Each of these server processes can spawn multiple threads, making it possible to satisfy client requests faster. Furthermore, client requests are dumped into one queue and serviced by the next available thread from any of the multithreaded servers. Should one of a server's threads become blocked — waiting for a response, for example — that server can start another thread to service the next client request in the queue.

This architecture is far more efficient in its use of resources and scales much better. This design predates multithreaded capabilities in most Unix operating systems, so the relational DBMS server vendors had to implement their own threads and take over the traditional operating system chores of memory management, process scheduling and queue maintenance.

The last architecture adds multiple queues to the multiserver, multithreaded design. In this architecture, servers pick their tasks from one of many queues, each of which is dedicated to a process and is shared by multiple clients. Using multiple queues makes performance far more predictable. This design also balances work load by enabling threads to migrate to idle processors in symmetrical multiprocessing systems.

M. Goulde

Architectural alternatives for client/server Relational DBMS engines



Multiserver, single-threaded architecture

Each client forwards requests for services to its own server process, which completes the task.

Multiserver, multithreaded architecture with single queue

Client sends requests to a queue and waits for the next available server process, which can spawn multiple threads needed to complete the task faster.

Multiserver, multithreaded architecture with multiple queues

Clients send requests for specific services into a queue and wait for the next server process that is dedicated to completing that task.

GRAPHIC BY SUSAN SLATER

SOURCE: PATRICIA SEYBOLD GROUP, INC., BOSTON

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SWISS TELECOM

Notes thrives in NLM form

CONTINUED FROM PAGE 1

In this initial release, this Notes server handles only two network protocols, Novell's Sequenced Packet Exchange (SPX) and Transmission Control Protocol/Internet Protocol. SPX II, the enhanced version of SPX used by NetWare 4.X, is not currently supported.

And Macintosh users will have to wait a little longer for AppleTalk support, which, according to Lotus, will be available in the third quarter. This lack of AppleTalk support can be a deal-breaker for some enterprise networks. Consequently, Macintosh users that need to connect to an NLM server must either run TCP/IP or connect asynchronously.

GETTING STARTED

Lotus has gone a long way toward simplifying the installation process of an inherently complex product. A truly painless installation, however, requires thorough planning and research.

At a minimum, the Lotus Notes server software requires an 80386 processor with 200M bytes of disk storage. Lotus, however, recommends an 80486-based system with 300M bytes of disk space. Notes runs as an NLM on the server and needs a minimum of 24M bytes of memory; but, again, Lotus recommends more — 32M bytes for 64 users and 48M bytes for 128 users. The OS/2 server version, in contrast, requires approximately half the memory.

Keeping those NLMs up-to-date

NLM	Function
SPXS.NLM	Updated version of SPX
IPXS.NLM	Updated version of IPX
TLI.NLM	Transport level interface
BIGRFIX.NLM	Handles large (512K bytes) read requests
CLIB.NLM	Updates Netware C library
STREAMS.NLM	Provides streams-based protocol services
AIO.NLM, AIOCOMX.NLM	Provides asynchronous communication capability
PATCHMAN.NLM	NetWare patch manager

Before installing Notes for NetWare, network managers must install the most recent patches for several key NLMs.

It's important to note that these memory requirements only apply to the NetWare operating system and the Notes NLM server. If the NetWare server performs other tasks, additional memory may be needed. We used a Dell Computer Corp. 466/ME, 50-MHz server equipped with a 1.3G-byte Small Computer System Interface drive and 32M bytes of memory.

The NetWare server must be running Version 3.11 or 3.12 of the network operating system (NOS). We were running NetWare 3.11 with Novell's SPX protocol. For 3.11 servers, there are several shipped patches for upgrading several key NLMs (see graphic).

We were a little surprised to discover that the NLM won't run on a NetWare 4.X server. When Lotus first discussed their development plans for Notes for NetWare, they indicated that they would support NetWare 4.X. Lotus has indicated that they are working on adding 4.X support, but has not announced any time frame for delivery.

Notes clients communicate directly with the Notes NLM and are not required to log on to the NetWare server. This means that organizations without NetWare site licenses need only purchase the minimum five-user version of the NOS, regardless of the actual number of Notes users who access the NetWare server.

To start the installation process, we first installed the Notes client on a workstation on our test network. This step is a marked departure from the installation procedures of the other Notes server platforms. Notes requires a graphical user interface (GUI) to manipulate and display data. Since the NetWare console lacks a graphical front end, a client system running a GUI is used to provide this missing ingredient.

The software installation is straightforward, but we encountered a few bumps in the road. Though the client and server software ship on a single CD-ROM, the installation program's instructions and procedures are geared toward a floppy disk-based procedure.

On the CD-ROM, there are multiple copies of the executable files located in different directories. One copy is for the server installation, the other is for the client. Once we deciphered the difference, the installation went pretty smoothly.

Notes allows for the installation of both private or public copies of the software. Installing a public copy of Notes puts common files into a shared network directory and nonshareable files into a user's private directory. Public copies are useful when appropriate — when users do not leave the office and can easily access the same shared files. This setup is also easier for network managers who would rather not install and update software across the enterprise. Road warriors, however, cannot conveniently share these common files. Instead, they require full Notes kits on their client workstations.

Once we finished the installation of the initial client software, we moved on to the server software. During the installation procedure, the software is copied to a user-specified NetWare volume. When this task is completed, the installation procedure automatically launches the server setup procedure.

The setup procedure defines various characteristics of the Notes server. These characteristics include basic information about the server, such as its name, the company name and who will administer it.

Continued on page 63

Clearing up the groupware confusion

Although Lotus Development Corp.'s Notes is gaining support in many corporate sites, confusion still exists about what the product is and how it functions. Compounding this confusion is the nebulous groupware cloud that surrounds Notes. Even though no two people seem to agree on what groupware is, Notes is widely touted as the de facto standard.

To better understand what Notes is, one also has to understand what it isn't. Because of its distributed architecture, Notes cannot be used as a transactional database manager. The synchronization of a Notes database does not happen in real time, barring it from the world of transaction processing. Also, Notes is not a relational database management system. While information can be linked across Notes databases, traditional links do not exist.

On the other hand, Notes does provide a framework for creating and sharing data between groups of users. One of Notes' strengths is that these groups can range enormously in both size and geographical diversity. These Notes users have access to the same shared data, regardless of their location. Why? Because the Notes architecture includes a mechanism that easily synchronizes Notes databases.

Notes has a true client/server architecture. That is, processing is distributed between clients and servers. For example, users who access a Notes database from a server can benefit from the database caching and indexing that occurs on the server.

In contrast, salespeople on the road will maintain local copies of the database on their laptops. Periodically, these salespeople can dial up the corporate Notes server via modem and synchronize the databases through a replication procedure.

Notes is built around a mail routing engine, which can be used for traditional electronic mail tasks and for including intelligent routing capabilities in Notes databases.

For instance, an expense account database can be mail-enabled so that once a user enters the appropriate information, the database is routed to a manager for approval. Similarly, once the manager approves or rejects the expenditures, the information is again routed to the appropriate user.

So for what kinds of applications is Notes appropriate?

Well it provides a good platform for reference databases such as company or industry guidebooks — information that changes infrequently, but is constantly accessed. For an accountant, access to a Notes database that contains Federal Accounting Standards Board rules and regulations can be a time-saver.

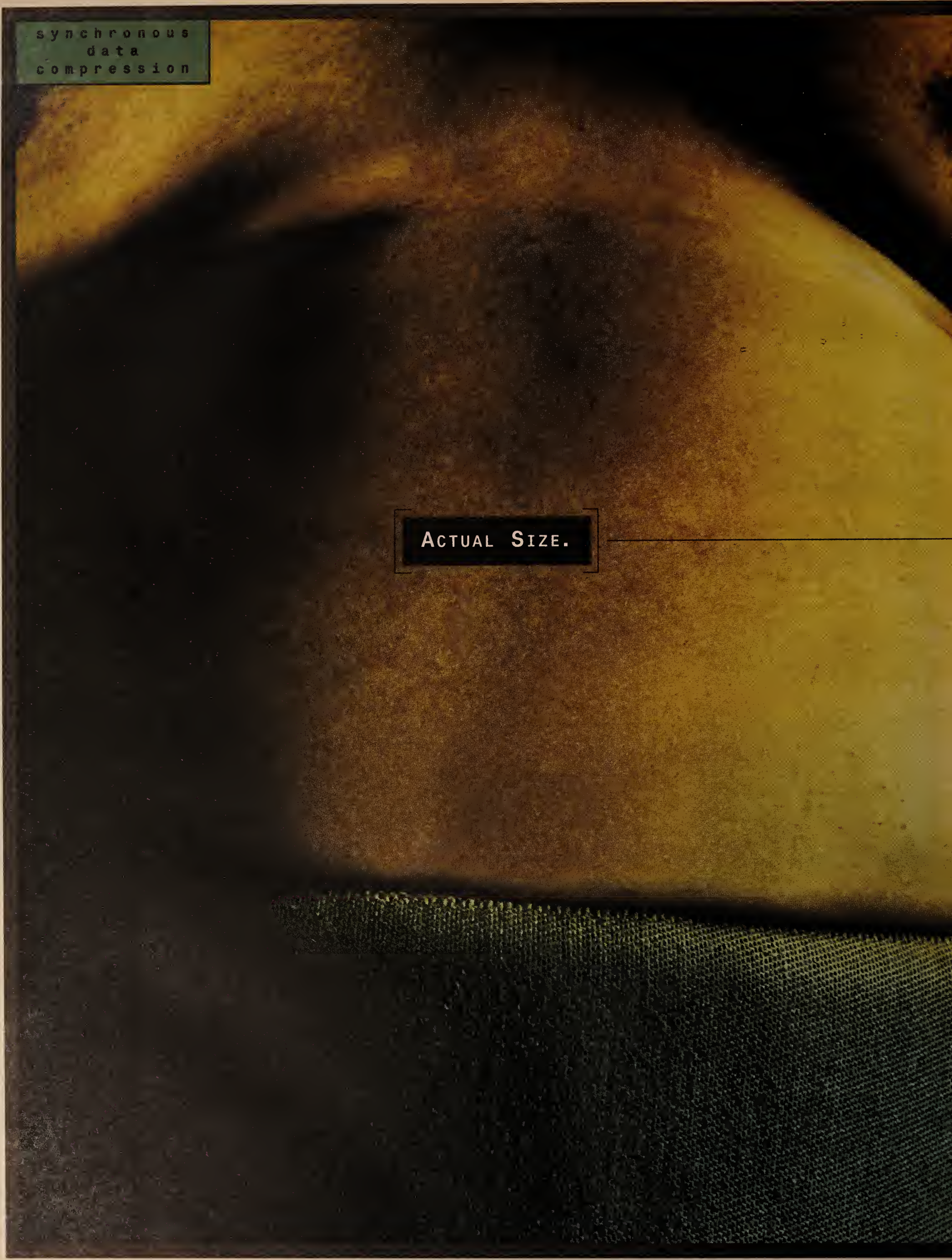
Notes is also a good candidate for tracking information, such as responses to a request for proposal. In addition, the product can be used to document and record the entire response process, creating an audit trail and eliminating the guesswork involved with determining the location of all the information.

Another of Notes' strengths is its flexibility in receiving and viewing data. Information can be entered through self-designed Notes forms, or imported in a number of popular data formats. Notes data fields consist of anything from numbers and dates to rich text and graphics. The data can be viewed and manipulated with Notes' powerful scripting language. Analogous to Lotus 1-2-3's "functions," database developers have free range over Notes data.

Notes has been gaining popularity during the last year. The product, now in its third release, allows the growing ranks of local and remote computer users to effectively share data. Information providers like *The Wall Street Journal* have adopted Notes for their publishing needs. And AT&T and Lotus have recently announced plans to create a public Notes network.

The ultimate success of Notes, however, depends on its ability to run on different client and server platforms. With the recent release of its Notes for NetWare server, Lotus has complemented an arsenal that already includes support for Unix, Macintosh and OS/2.

S. Goldberg



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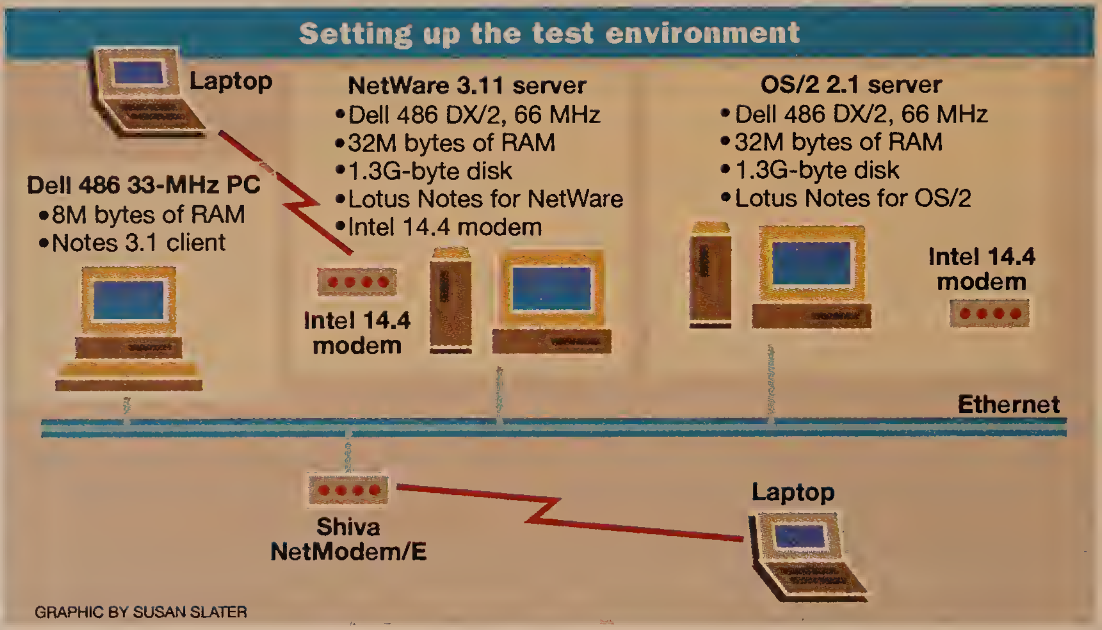
MOTOROLA

Circle Reader Service #24

Continued from page 60

We were also able to select the communications protocols. A Notes server can be configured to handle multiple network protocols — SPX and TCP/IP, for instance. In our test environment, however, we only ran SPX.

Additionally, we configured the NLM server for asynchronous communications using an Intel Corp. 14.4K bit/sec modem. To use asynchronous communications on the NetWare server, both AIO.NLM and AIOCOMX.NLM must be loaded. Network administrators may also use third-party communications servers, such as Shiva Corp.'s NetModem/E or Digital Communications Associates, Inc.'s Remote LAN Node, with Notes for NetWare.


Setting up the test environment

GRAPHIC BY SUSAN SLATER

ARE YOU CERTIFIED?

Notes creates three identifier, or ID, files. There are two categories of IDs — one that applies to users and servers, and a certifier ID.

A user or server ID file contains information about a valid Notes user or server. This unique ID file contains Notes licensing information, authentication keys and encryption keys to secure information stored in Notes databases. During installation, IDs are established for the Notes Administrator and for the new server.

The certifier ID, in essence, stamps both the user ID and the server ID. This unique stamp, or certificate, is the validation mechanism that permits client-server and server-server communication.

Notes provides two different certification schemes, canonical and hierarchical. In a canonical environment, each ID must be certified by all Notes servers that it will access.

The hierarchical scheme, which is X.500-compliant, employs a parent-child certification relationship. This scheme enables an ID to access its parent server, as well as all of its ancestors.

These IDs also have the benefit of easing migration from different Notes environments.

For instance, to migrate our OS/2 Notes server to a NetWare platform, all we needed to do was make copies of our server and user IDs, as well as our certifier IDs. During the Notes server for NetWare setup, we designated these files as our Notes ID files, rather than create new IDs. This feature is invaluable for net managers confronting this same migration issue.

HOW WE did it

We tested Lotus Development Corp.'s Notes in a 10Base-T Ethernet network. We installed the Notes for NetWare and the Notes for OS/2 servers on identical Dell Computer Corp. 486/66 servers, each with 1.3G bytes of disk storage, 32M bytes of memory and 3Com Corp. 3c509 32-bit network interface cards (see graphic).

For our local clients, we used Dell 486/33 personal computers with 8M bytes of random access memory and NetWare NE2000 16-bit network adapters. We used a Dell laptop client with 8M bytes of RAM to test remote connectivity. For our remote access tests, we used an Intel Corp. 14.4K bit/sec modem to dial directly into the Notes servers. We also connected to the local-area network through a Shiva Corp. NetModem/E.

After generating the IDs, Notes creates a database known as the Name and Address Book.

This required database stores specific information about the Notes net. It records all user information, network port definitions, user group names and a host of other information. Servers in the same network, or Notes domain, share a name and address book.

Once this Name and Address Book is created, the setup procedure creates a log file, which stores detailed information about server activity. Finally, the server creates a mail database for the administrator. The server can then be started by loading the Notes NLM from the NetWare file server console.

After installing the server software, we went ahead with the task of installing Notes on our clients. This process is simple, but creating the user IDs can take several minutes of processing to create and verify encryption keys. This process can, however, be automated with a script file, using Notes' scripting language. The setup process enters each user into the server's name and address book and creates mail databases.

New horizons

Over the past several months, Lotus has been filling out its Notes product line. Unix and Macintosh clients have been added to the list, which includes Windows and OS/2. On the server side, Notes comes in four flavors — OS/2, Unix, Windows and, now, NetWare.

We were pleased with how well integrated Notes was with the NetWare environment. In our NetWare LAN, the server functioned smoothly. We were able, for instance, to use our existing NLM-based tape backup software to back up Notes files while our Shiva NetModem/E provided a clean alternative to using the NetWare server as an asynchronous communications server for remote access.

Managing this Notes server is a no-brainer. Its features match those of the OS/2 version. Notes administrators can generate a wide array of statistics and set user-definable notification alarms. And Notes' client/server architecture fully supports remote management. We connected through an Intel modem on the server and gained full, albeit slower, access to Notes.

To compare the performance of the Notes NLM server to that of the Notes OS/2 server, we executed some basic Notes tasks on each platform. We performed a single-server, single-client database replication task for each of the two Notes server platforms.

As a second test, we ran a database index procedure. This procedure, which runs on the server, creates a full text index that is used for searching a database.

We used a Windows-based client for each test and identical hardware platforms for each Notes server.

In both tests, the NetWare server outperformed the OS/2 server. The database replication took 1 minute 12 seconds from the NetWare server and 1 minute 24 seconds from the OS/2 server. The full text index took 56 seconds to create on the NetWare server, and required 1 minute 18 seconds on the OS/2 server.

Lotus has not, to date, discussed in detail performance comparisons between the different Notes server platforms, but the company plans to release a white paper this quarter with OS/2 and NetWare benchmarking results.

Our initial findings, however, indicate that the NLM has a performance edge over the OS/2 server.

For many sites, Notes for NetWare represents the best of two worlds. It goes a long way toward combining the most prevalent NOS with a groupware application that can, potentially, change the way entire organizations communicate and work.

In this initial release, the Notes NLM server is a sure bet for homogenous NetWare LANs. NetWare-savvy managers looking to keep the OS/2 hounds at bay will find it complex, but quite bearable.

For larger, more sophisticated environments, however, Lotus still has some issues to resolve. Support for NetWare 4.X is not included in this release, and the network protocols are currently limited to Internetwork Packet Exchange (IPX) and TCP/IP, leaving Macintoshes running AppleTalk out in the cold.

Lotus also needs to add support for Notes companion products, such as the OCR and Notes fax server modules, as well as for LN:DI.

All in all, Notes for NetWare represents a great first step, but the ultimate proof will be in how quickly it hits its full stride.

➺Goldberg is a network analyst at a Boston-based health maintenance organization. He can be reached at sgoldberg@vax.clarku.edu.

Letters

Wake up, IBM

I completely agree with your editorial about IBM's new parallel processing mainframes (April 18, page 46). As a person who has worked with many systems of varying architectures, I have often had to deal with integrating IBM mainframe class systems into existing open environments. The fact that IBM is (and has been) so proprietary and closed (as well as closed-minded) has always made working with their products astronomically expensive and complex.

I first encountered this when I worked for the former Contel Corp. in Chantilly, Va. The IBM 4381 MVS system that was on-site required very specialized and expensive support for running a minimal number of applications. It cost the company about $2 million per year to maintain and support with approximately six systems support persons. And it only ran one major application: a personnel/payroll system based on Computer Associates International, Inc. software. Conversely, the other major system was a Digital Equipment Corp. VAX cluster, which ran about 15 different applications supporting numerous in-house and contracting requirements. The VAX system cost less than $200,000 per year and required only two system support persons (I was one) to maintain. Can you figure out the economies of scale in that example?

When Contel was taken over by GTE Corp., guess what was the first thing to go: the outrageously expensive IBM system and most of its related support personnel. Before the takeover, whenever we questioned Contel upper management about why they kept this expensive, closed-system behemoth around, the answer was always: "It looks good, and it makes the IS bosses happy to have another major platform in our big, expensive computer room."

IBM should have gone open a long time ago. I'm tired of the way they have tried to force their standards down people's throats. In my opinion, they should provide fast, mainframe hardware platforms that fit with varying architectures and should either make more open, cooperative software or just let their boxes run other open software. I propose death to CICS, VTAM, MVS and SNA (unless they can be made much more open). I just hope IBM wakes up to these facts before it's too late (or is it already too late?).

(The opinions expressed here do not necessarily represent those of my employer.)

Jeff Mason
Systems technical support specialist
Willis Corroon Corp.
Nashville

Still not rooting for telecommuting

Regarding the responses to my letter disputing the value of telecommuting (April 18, page 47):

Is it a Neanderthal management technique to walk in an office, as a boss, and ask "How's it going?" Management by Wandering Around is as valid today as it was when it first pre-

See **Letters**, *page 64*

Letters

Continued from page 63

sented. If you think that you, as a worker, can exist in your own little world, insulated from the rest of the worker bees, then you truly are destined for a layoff.

You can choose to ignore reality or continue to think that telecommuting is the savior. Regarding the traffic situation in this country, if the states, counties and cities would spend money on streets instead of on giveaways, that would take care of the problem. Air pollution? Figure out where else you would rather go in this world (a big city, that is), and tell me where the air is cleaner. I don't know how you forgot clean water and the spotted owl.

I especially enjoyed one respondent's comment about managing with "measurable benchmarks." So it doesn't matter to him that the work may have been done previously, just so the work was done?

The respondent just proved my point, but his selection of words was impressive: "deliverables," "measurable benchmarks" and "software functionality."

I suppose one of the least understood parts of my original letter was my remark about management using a cattle prod.

While some may not like the term, it is a useful concept and one buttressed by a recent article in the *Contra Costa Times,* a local San Francisco newspaper. In his Secrets of Success column, Mark McCormack, president of International Management Group, states: "...but I have to believe that it's good for employees to hear their boss's footsteps once in a while."

It is important to remember each person's objective in a manager/employee relationship. The manager wants to get the most work from an employee for the least amount of pay; the employee wants to get the most money from an employer for the least amount of work. Somewhere in the middle is where it all happens.

Don Farrar
Senior systems programmer
Sysorex Information Systems, Inc.
San Francisco

Searching for Sigma

Your article, "Con Ed gets a spark from $25m upgrade" (May 2, page 1) mentions a New York-based software company called Sigma Imaging Systems, Inc.

I am trying to contact this company to get more information on the work flow/imaging software called OmniDesk, which is mentioned in the article.

If you could provide me with a way to contact the company, I would be most appreciative.

Jim Stroud
Member of technical staff
AT&T Bell Laboratories
Holmdel, N.J.

Editor's reply: You can reach Sigma at (212) 476-3000.

Wording suggestion

Regarding the item in your Network Help Desk section that read "Do you know of Internet File Transfer Protocol (FTP) sites..." (May 2, page 2):

Such wording is confusing to the reader. No one on the network spells out FTP. In fact, ftp (lowercase) has become a verb. But your column is written expressly for those who are not among the cognoscente.

How then to reflect common usage and still get the message across? Simple — just put the common terminology in the main text and the explanation in parentheses. For example: "Do you know of FTP (File Transfer Protocol) sites..."

Richard Wexelblat
Systems architect
Internal Revenue Service
Washington, D.C.

Editor's reply: Network World *recently solicited readers' opinions on our acronym style policy, which is to spell out most acronyms on their first occurrence in an article, with the acronym following in parentheses, and to use the acronym on all subsequent references in the article.*

The majority of readers were in favor of retaining this policy (Jan. 17, page 27).

Help desk

Continued from page 2

ForComment but cannot find any information concerning it.

Josephine Tedesco,
Victoria, Australia

Stephen Assad, a technical support representative at Corporate Software, Inc., a PC software products, support and systems integration company that is based in Canton, Mass., replies:

Computer Associates International, Inc.'s CA-ForComment Document Review Software 2.5.2 allows a group of users on a Digital Equipment Corp.

Pathworks or Novell, Inc. NetWare network to review and edit documents on-line as a collaborative effort. CA-ForComment allows document reviewers to make on-line comments, see each others' comments, question and clarify opposing positions, and base input on previous suggestions.

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Prices for CA-ForComment range from $195 to $700. For more product information, call (617) 329-7700 Ext. 7322.

CORRECTION

For those of you who tried — unsuccessfully — to remove the QRRY virus from your PC hard drives, don't despair. The advice we gave in our May 9 column (page 2) contained a small but pivotal error — we left out a slash. The correct procedure to initiate the Master Boot Record reconstruction is: At the A: prompt, type FDISK/MBR and press the Enter key.

Happy virus hunting.

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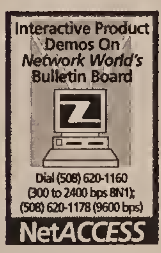
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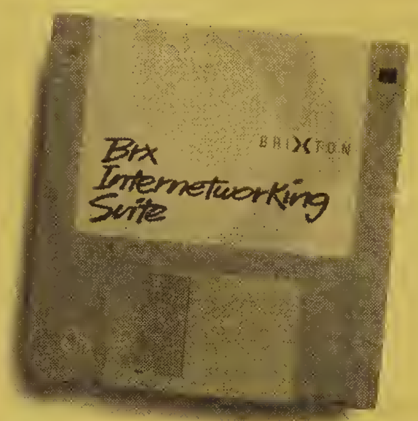

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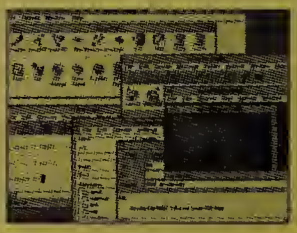

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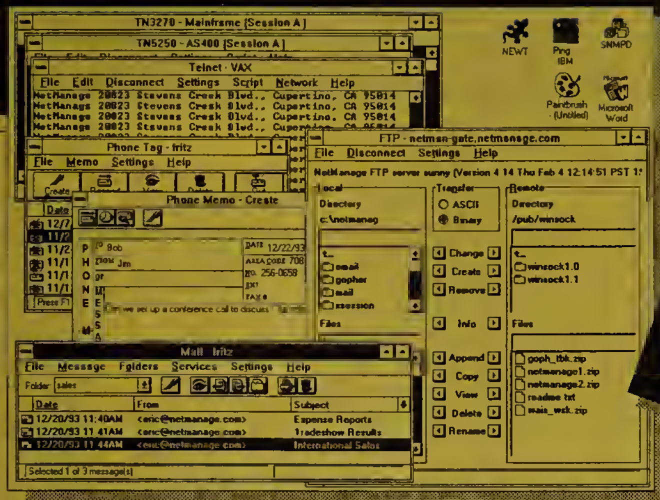

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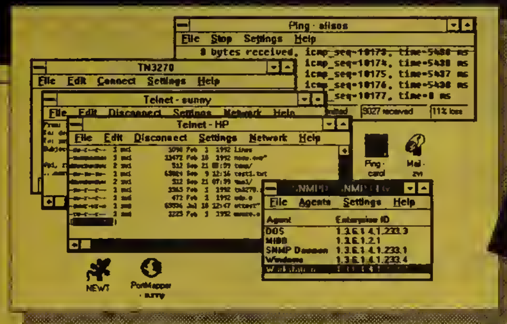

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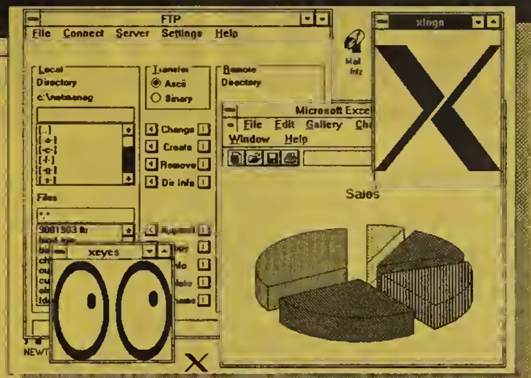

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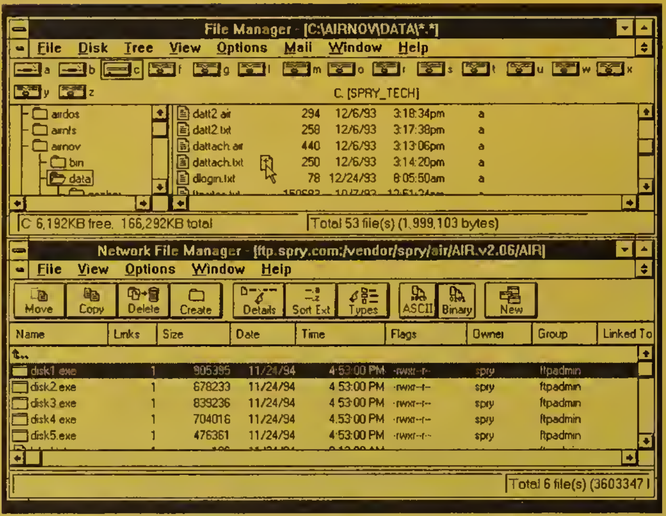
File Manager - [C:\AIRNOV\DATA\*.*]
File Disk Tree View Options Mail Window Help
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Network File Manager - [ftp.spry.com:/vendor/spry/air/AIR.v2.06/AIR]
File View Options Window Help
Move Copy Delete Create Details Sort Ext Types ASCII Binary New

```
C: [SPRY_TECH]
airdos        datt2.air      294  12/6/93   3:18:34pm  a
airnfs        datt2.txt      258  12/6/93   3:17:38pm  a
airnov        dattach.air    440  12/6/93   3:13:06pm  a
  bin         dattach.txt    250  12/6/93   3:14:20pm  a
  data        dlogin.txt      78  12/24/93  8:05:50am  a
C: 6,192KB free, 166,292KB total      Total 53 file(s) (1,999,103 bytes)

Name       Links  Size     Date      Time        Flags       Owner  Group     Linked To
disk1.exe  1      805395   11/24/94  4:53:00 PM  -rwxr--r--  spry   ftpadmin
disk2.exe  1      678233   11/24/94  4:53:00 PM  -rwxr--r--  spry   ftpadmin
disk3.exe  1      839236   11/24/94  4:53:00 PM  -rwxr--r--  spry   ftpadmin
disk4.exe  1      704016   11/24/94  4:53:00 PM  -rwxr--r--  spry   ftpadmin
disk5.exe  1      476361   11/24/94  4:53:00 PM  -rwxr--r--  spry   ftpadmin
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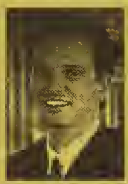

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Mike Montgomery
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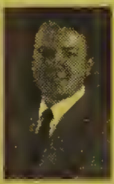

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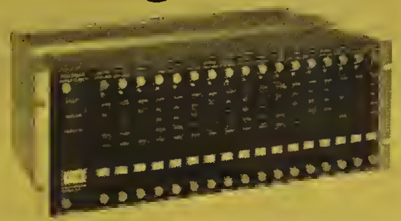

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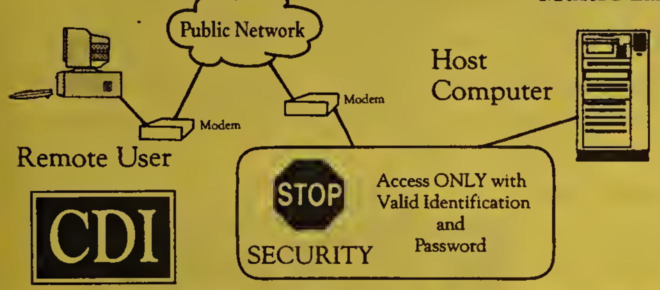

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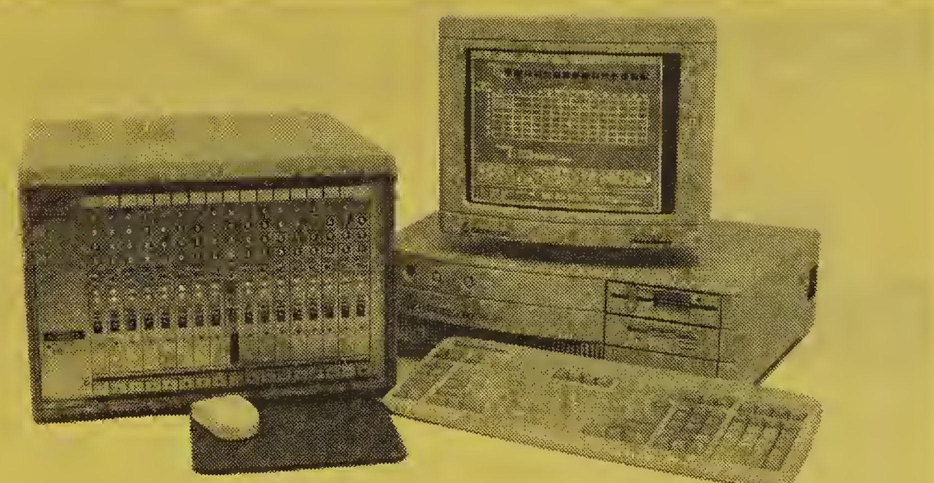

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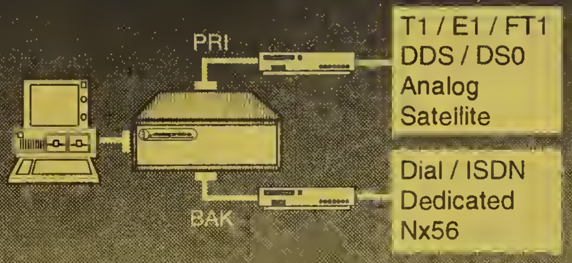

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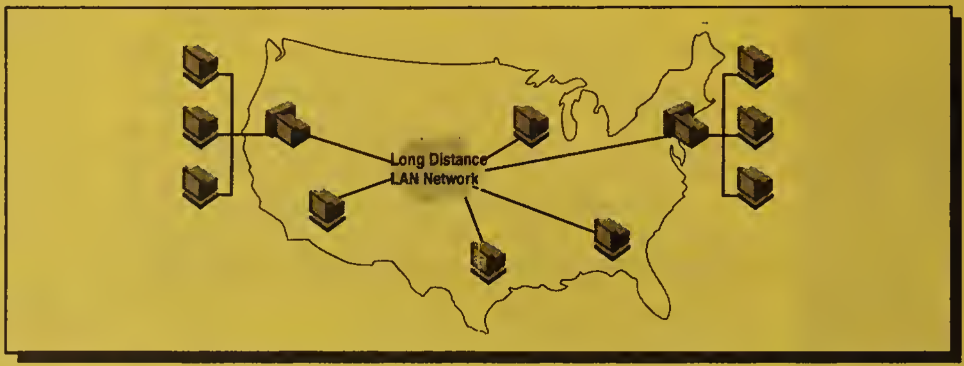

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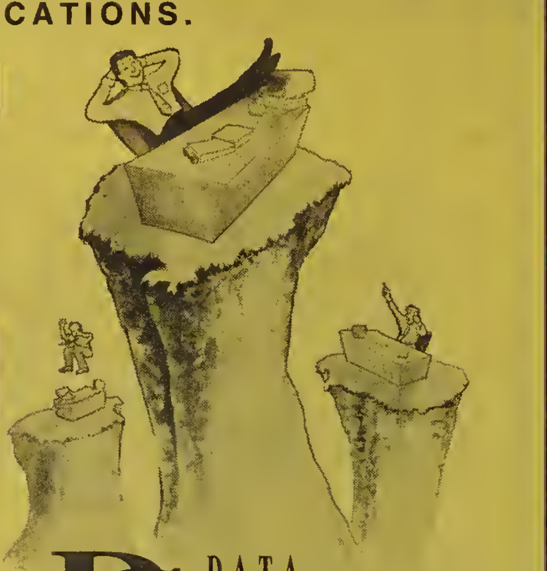

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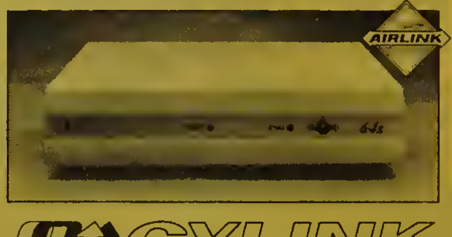

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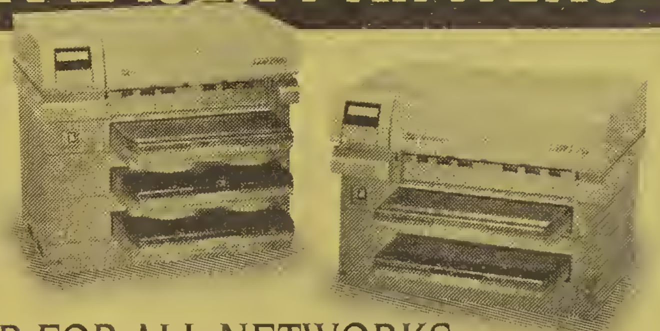

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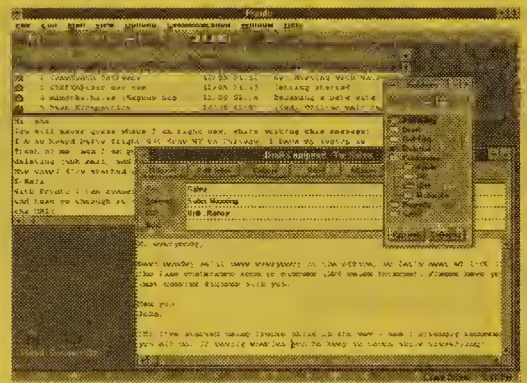

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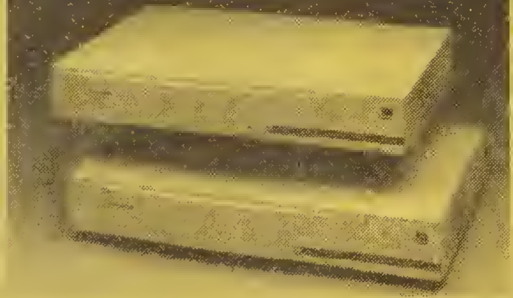

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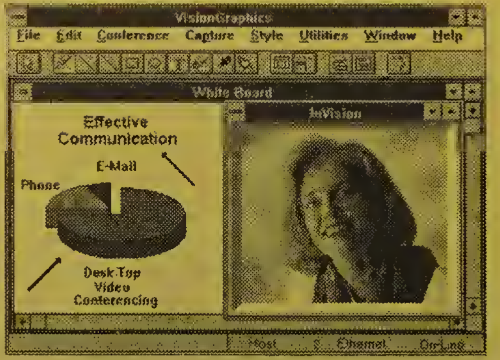

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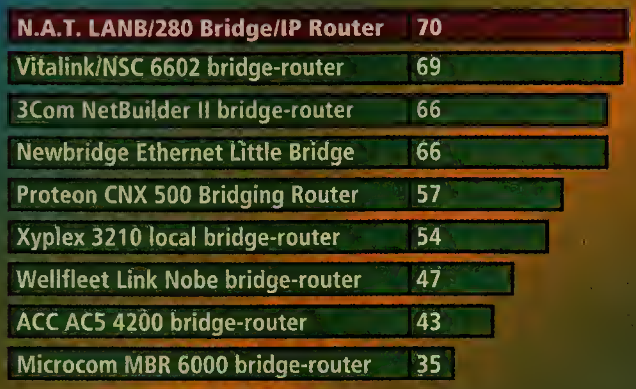

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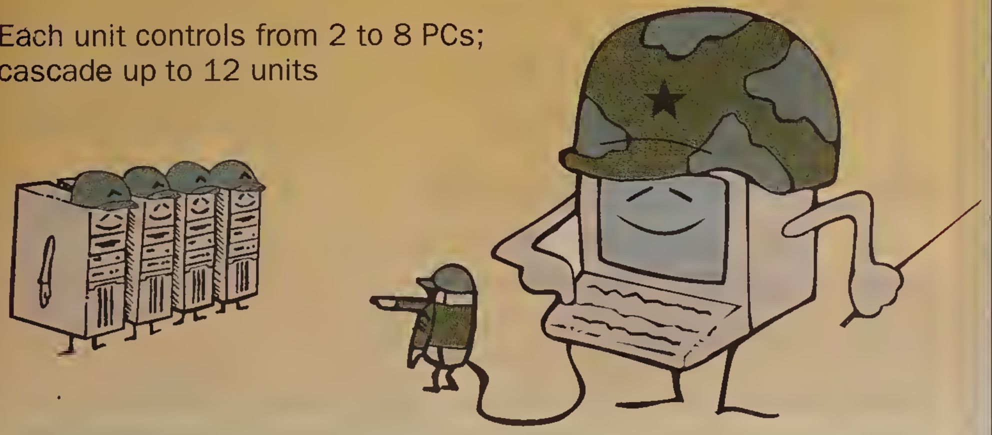

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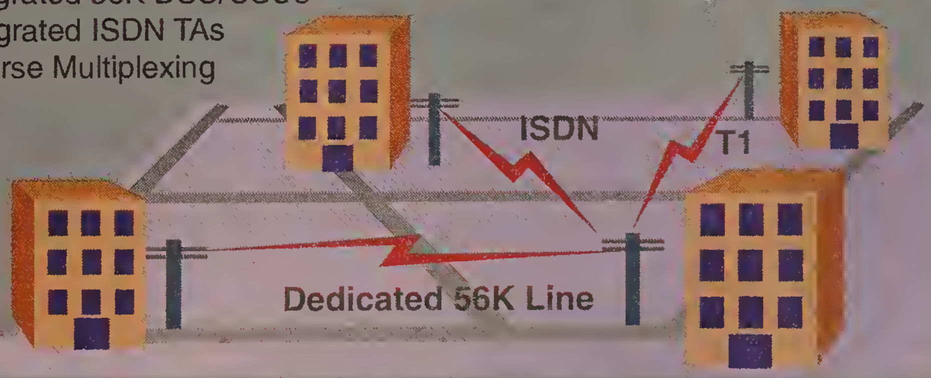

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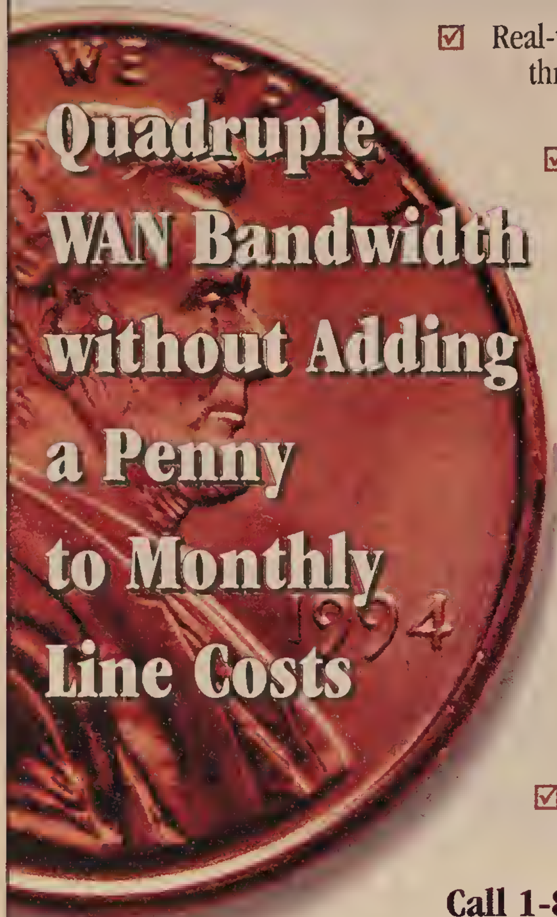

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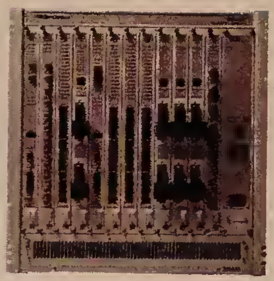

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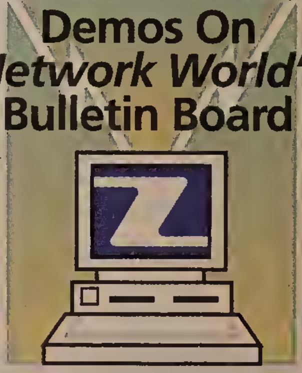

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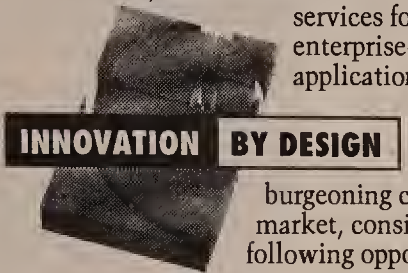

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ATMizer

Continued from page 1

packet-based traffic into 53-byte ATM cells that will be switched to destination ports by the ATM switch.

In addition, ATMizer will offer up two ATM ports operating at 155M bit/sec that can provide access to a server farm or a regional ATM switch.

With ATMizer, users may be able to eliminate local routers in their campus environments, perhaps redeploying them at remote sites. Since ATMizer will not offer wide-area net interfaces, users will probably still need a backbone router that will provide campus users with access to the outside world.

The initial ATMizer offering will support Ethernet networks, with token-ring and Fiber Distributed Data Interface support planned for the future.

Bill Seifert, president and chief executive officer at Agile — which has been heavily funded by venture capital firms and has been the topic of much industry discussion — declined to discuss the product but shared Agile's broad strategy in a recent interview.

''We are designing a LAN backbone networking system for high-performance campus nets that is based on a new model,'' he said. ''It will simplify administration by easing moves, adds and changes, and allowing users to efficiently centralize servers.

''We also want to provide high network availability and reliability via a net infrastructure that will support real-time applications such as multimedia.''

Seifert, one of the founders of router vendor Wellfleet Communications, Inc. and its former chief technologist, said the product will likely go into beta test next month and be officially rolled out late this summer.

Analysts acknowledged there is a market opportunity for products such as ATMizer. ''In order for these emerging ATM internets to function efficiently, there is a need to remove the complex routing software from the equation,'' said Fred McClimans, principal at Decisis, Inc., a consultancy in Herndon, Va. ''Agile, like its competitors, will offer a proprietary way to do this, meaning interoperability will be the chief concern.''

Agile will attempt to differentiate itself from rivals through its Relational Networking scheme, which is Agile's spin on the creation and interconnection of virtual workgroups. Under its approach, Agile will try to abstract the net layer from the transport layer to let net managers more easily move and add users within the campus net.

Different LAN segments can be connected in logical workgroups, with ATMizer routing traffic between virtual segments. This integrated routing capability offers users a cost advantage over conventional routers since additional ports do not have to be added to support each virtual LAN.

Peter Sevcik, principal at Northeast Consulting Resources, Inc., a Boston-based consultancy, classifies the ATMizer as what he calls an edge path adapter (EPA), a product that links traditional connectionless LANs with connection-oriented ATM networks.

''EPA products are beginning to emerge in two classes,'' he said. ''Some products, like NetEdge [Systems, Inc.] ATM Connect router, sit at the outer edge of the campus and provide access to ATM WANs and public services, letting users keep their existing internetworks intact. Conversely, ATMizer sits in the wiring closet and lets users eliminate the need for campus routers.''

This second group of EPAs is an increasingly crowded one. A variety of router, hub and switch vendors will be competing in this space and requiring various levels of investment in next-generation switching hubs or ATM-based routers. But, Agile requires no forklift upgrades to offer the same functionality, allowing a company to use its existing departmental wiring hubs and avoid purchasing additional routers or high-end hubs.

Pricing for ATMizer is also expected to come in at about 50% lower than competing hub- or router-centric products.

''ATMizer has the potential to really set the standard for this fledging ATM internet market,'' said one analyst requesting anonymity who was briefed by Agile. ''It's relational networking method will set it apart from rivals and ease users' apprehensions about integrating their LANs into an ATM backbone.''

While McClimans said beefing up the collapsed backbone and decoupling the physical infrastructure from the logical network is sound strategy on Agile's part, he questioned ATMizer's overall impact.

''You can expect good things from Agile based on Seifert's presence alone, but I'm not sure this product is significantly different from what other vendors are attempting to do,'' he said. ''I don't question the product's capabilities so much as Agile's ability to market it, support it and convince people to go with them.''

Novell

Continued from page 1

The location of all objects throughout an enterprise remains transparent to the user.

''NetWare will play the role as the object broker for several infrastructures,'' said Willie Tejada, director of marketing for Novell's AppWare Systems group.

Novell plans to provide similar ORB technology in its AppWare Bus, which developers can use to build object-oriented applications that can then take advantage of the NetWare-based infrastructure.

''We anticipate the AppWare Bus will support multiple ORB infrastructures,'' Tejada added.

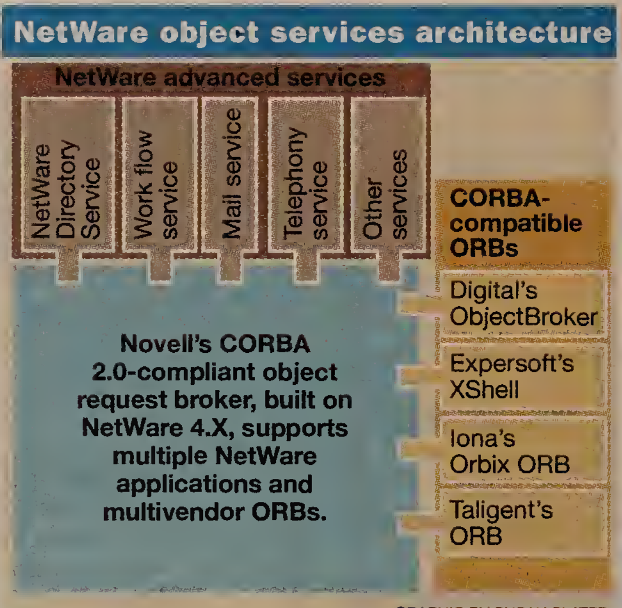
Tejada said Novell's NetWare-based object product will be a set of NetWare Loadable Modules (NLM) that will basically add an ORB function to a NetWare 4 server.

The object services NLMs will provide the necessary communication between telephony, multimedia, directory service and other applications running throughout distributed NetWare LANs.

The NLMs will also comply with the Object Management Group's multivendor Common Object Request Broker Architecture (CORBA)-2.0 specification, which defines how ORBs from different vendors can interoperate. That will let users plug in other vendors' ORBs where necessary.

For developers using AppWare, Novell will incorporate into the AppWare Bus the Systems Object Model (SOM) technology it got through the WordPerfect Corp. acquisition. SOM, IBM ORB technology used by WordPerfect, will allow developers to use other vendors' ORBs to create distributed applications.

For example, Tejada alluded to the possibility of Microsoft Corp. providing an OLE AppWare Loadable Module to let users develop Object Linking and Embedding-based applications using AppWare tools.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Novell's CORBA 2.0-compliant object request broker, built on NetWare 4.X, supports multiple NetWare applications and multivendor ORBs.

GRAPHIC BY SUSAN SLATER

IT'S ABOUT TIME

Industry observers agreed said Novell is overdue in detailing its object plans.

''It's not like people are beating them up for products, but people want to know their long-term strategy,'' said Chris Stone, president of the Object Management Group, which defined the CORBA specification. ''The model for distributed services is turning out to be ORBs, and people want to know what Novell's going to do.''

Users agreed. ''We've put a lot of consideration into what object technology would mean for our company,'' said Scott Lewis, assistant vice president of PC and LAN services at Connecticut Mutual Life Insurance in Hartford, Conn.

''Right now, we are working on developing some object-based applications, and also trying to find the best way to implement things like ORBs across the local nets.''

Kevin Madzia, senior information engineer at Wheeling-Pittsburgh Steel Corp., said the move to NetWare 4 has forced him to consider what object-oriented technology would mean for his company because it is more object-based than NetWare 3. Having Novell articulate its object strategy will help users get a beter grasp of how objects will play in their own nets, he said.

Novell's plan is different from that of other vendors in that it is network-centric and supports multiple ORBs, but analysts agreed the approach makes sense.

''If anybody is going to have a develoment tool that does distributed objects and allows you to partition ap plications across servers, there is no way you can be tied to one [ORB],'' said John Faig, senior research analyst at the Meta Group, Inc., a research and consulting firm in Westport, Conn.

Frank Dzubeck, president of Washington, D.C.-based consultancy Communication Network Architects, Inc., pointed out other advantages to Novell's approach.

''The stuff that Novell's doing is going to be scalable; it will be able to scale the biggest enterprise you can imagine,'' he said.

Senior Writer Adam Gaffin contributed to this story.

Ungermann back in view with ATM

BY SKIP MACASKILL

He's baaaaack.

Ralph Ungermann, founder of Ungermann-Bass, Inc., will make his long-awaited reentry into the networking industry later this month when he launches a new company established to develop Asynchronous Transfer Mode (ATM) desktop applications.

Ungermann, who last year resigned from UB for a variety of personal reasons, will announce the formation of First Virtual, a privately funded venture that will be based in the Silicon Valley.

Ungermann declined to comment on the up-coming announcement, but sources familiar with his plans said First Virtual will help users meet high-bandwidth requirements at the desktop. ''The company will offer a primarily software-based solution for providing real-time multimedia bandwidth to the desktop at a price that is affordable and has the least possible impact on a user's existing infrastructure,'' said one industry analyst requesting anonymity. ''Ralph is tapping into a new market that has unlimited potential.''

His venture capital firm, Accel Partners, apparently believes in that unlimited potential, as well. Accel bucked a long-standing company tradition of pooling money from a variety of sources to fund a start-up, deciding to provide the initial round of First Virtual financing on its own, which topped out at $2 million.

While details were sparse, Ungermann will reportedly embrace a ''virtual corporation'' business model, meaning he will maintain a small core of personnel while building and coordinating a global net of independent software developers, manufacturers and marketing firms.

Senior Editor Caryn Gillooly contributed to this article.

DBMS

Continued from page 43

Oracle8, due for release late next year, will be object-oriented and include the ability to automate the handling of documents, not just data.

THE NEXT 25 YEARS

Rich Finkelstein, president of the Performance Computing, Inc. consultancy in Chicago, predicted that relational databases will evolve over the next decade, rather than be replaced by object-oriented databases and other technologies. ''People have just ended up spending jillions of dollars'' on relational databases and are unlikely to abandon them, he said.

As firms move to distributed applications running across heterogeneous nets, relational databases are being stretched beyond their original and ''algebraically very elegant'' ad hoc query and reporting functions envisioned by Codd, said Umang Gupta, founder and president of database and development tool vendor Gupta Corp. in Menlo Park, Calif.

''It's probably a misnomer to call these products relational databases anymore,'' because of the extra capabilities added to them in recent years and those that are being added to them now, he said.

INTERNET tips

BY ADAM GAFFIN

One in a series of tips on Internet-based information services.

EDI information on-line

Sterling Software, Inc. maintains a repository of information related to EDI. Resources include:

- ✔ **Archives of EDI-related mailing lists**
- ✔ **Documents on proposed standards for EDI over the Internet**
- ✔ **Documents about EDI in the health care field**

To access:
Use FTP to connect to ftp.sterling.com. Log on as "anonymous" and use your E-mail address as the password. Then use the cd command to switch to the edi directory.

NETWORK WORLD

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EDI

Continued from page 5

under national health insurance, Petry said.

IBM Credit Corp. of Stamford, Conn., which finances large purchases by computer resellers, learned about size limitations when it tried to establish EDI connections. Christopher Bernard, a senior programmer at the IBM subsidiary, said the MVS mainframe it was using was taking too long to process credit checks and similar requests.

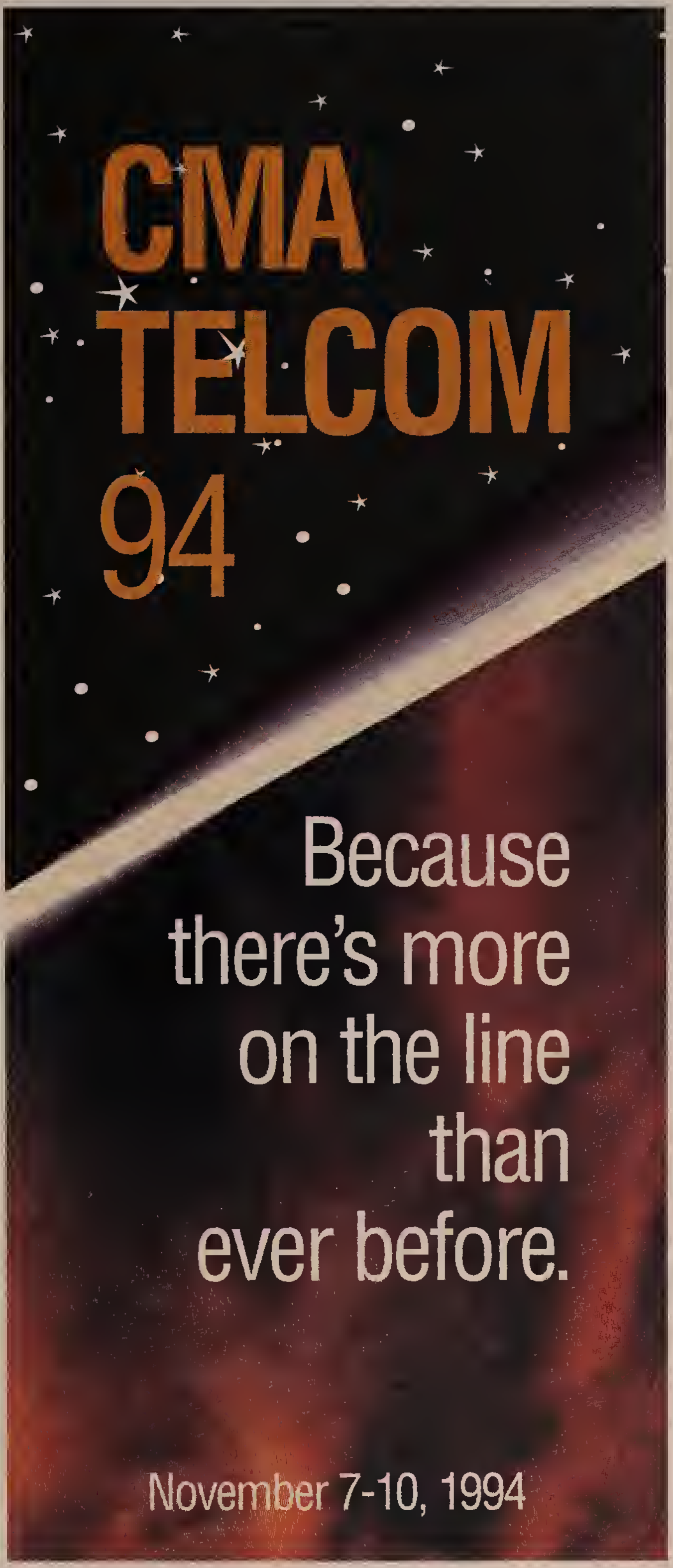
Bernard used a standard developed by the International Standards Organization to shave an average of 150 bytes off each EDI transaction. This is done through steps such as using a 2-bit identifier as a token for an empty field, rather than translating the entire field. It doesn't sound like much, but it means faster turnaround for four companies that have signed up so far, he said.

The Accredited Standards Committee X12 group, which sets EDI standards for the U.S., is currently considering its own standards for interactive EDI.

Petry, who chairs an X12 health care committee, said savings could come through such means as eliminating explicit field definitions within EDI messages. He said this would work between two trading partners who agree ahead of time on those definitions.

In April, however, two health care-related transaction sets proposed by a subcommittee chaired by Petry were rejected by X12. Part of this grew from concern over mixing U.S. and international EDI standards. But part came from concerns of the travel and leisure industry, having its own definitions of "interactive."

Comments?
See "Contacts" box on page 2.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Competition

Continued from page 9

the new business areas the telephone companies are allowed to enter, such as CATV and long distance.

Although Rochester Telephone is not restricted by the Modified Final Judgment and already has a long-distance subsidiary, both units are monitored by the commission.

The plan would free Rochester Telephone from that oversight.

"Now they will be able to bundle packages of services under one billing structure, which will be attractive to large customers such as Eastman Kodak Co.," he said.

The Rochester Telephone deal — still subject to formal approvals expected by the commission in August or September — would also lock in lower rates for customers. The commission has mandated under the plan that the phone company reduce its usage and basic charges by $21 million over a period of seven years beginning in 1995. Fees for each year have been preset. This would build in some protection for users, which have seen continual price hikes in the long-distance arena for the past three years (see story, page 28).

Other pieces of the complex agreement call for phone number portability among all competing local networks and the establishment of a state-regulated Rochester Telephone company to sell bandwidth wholesale.

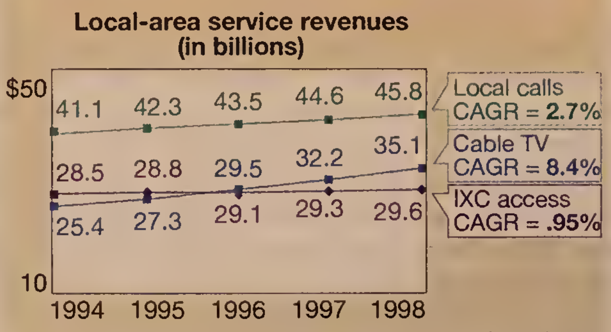
The wholesaler, R-Net, will sell capacity to all local players at equal prices. Local participants would include newly formed retail Rochester Telephone company, R-Com; Time-Warner; and alternate access providers FiberNet and MFS Communications Co., which are all participating or plan to participate in the Rochester market.

While observers were encouraged by the Rochester breakthrough, "It would be wrong to say this is the wave of the future," said Brian Moir, a partner with law firm Moir & Hardman in Washington, D.C. and counsel to the International Communications Association user group.

"There are a lot of local monopolies that are only going to move this way kicking and screaming — when the government orders them to," Moir said.

The more the merrier?

New players in the local market will encroach on local exchange carriers' already flat turf and fuel growth of new areas for competition, such as cable services.



IXC = Interexchange carrier CAGR = Compound annual growth rate

GRAPHIC BY TERRI MITCHELL SOURCE: INSIGHT RESEARCH, LIVINGSTON, N.J.

Reductions

Continued from page 9

outside the U.S. Most analysts agreed, however, that Network Systems would be spared the axe.

Apparently not.

"This action could be the first indication that Networking Systems hasn't been pulling its weight recently," said Robin Layland, principal consultant with Layland Consulting in West Hartford, Conn. "The unit has done well in the past, so it was left alone. But if you look now, you see things like the failure of the 6611 [router] and some fraying at the edges."

According to Thomas Nolle, president of the CIMI Corp. consultancy in Voorhees, N.J., aside from Asynchronous Transfer Mode (ATM) products, IBM hasn't made it clear where its future investments will lie.

"It is imperative that IBM define its priorities better," Nolle said. "Users need to know their buying decisions are credible, and right now IBM isn't helping them."

IBM has large investments in a few key technologies, including ATM, on which it is spending more than $100 million per year in research and development. IBM is also heavily vested in the client/server market and enabling networking technologies, such as its Advanced Peer-to-Peer Networking (APPN) and Advanced Program-to-Program Communications, all of which are developed in here. But analysts said the company is struggling to define other new markets it can aggressively attack.

"There have been search and destroy teams prowling the halls of IBM labs all over the U.S.," said one user who requested anonymity. "I don't think we'll see any radical shifts, but many of the technical guys in Raleigh had their hands full of development work already."

According to Anura Guruge, an independent strategic analyst in New Ipswich, N.H., "All of the layoffs and shifting priorities are a distraction, but I don't think users will see any delayed products or anything like that just yet."

EDS/Sprint

Continued from page 5

with current and future customers by offering true desktop-to-desktop computing and telecommunications services across both wide-area and local corporate networks," EDS Chairman Les Alberthal told analysts at a briefing last week.

The merger would reflect the user trend away from separate MIS and voice operations, and toward a unified network strategy that encompasses both telecommunications and computing, according to Gary Fernandes, a senior vice president at EDS.

Some believe that customers would welcome a single source that could provide expertise in both areas.

"Networking and computing is becoming so complex that it's almost beyond the capability of even those organizations that have mammoth information technology operations to manage the environment as efficiently and effectively as they can," said Peter Bernstein, research vice president with consultancy Probe Research, Inc. in Cedar Knolls, N.J.

However, the two companies may be held back in offering combined computing and telecommunications services by the Federal Communications Commission and court rulings barring such packages, said Al Bieber, president of the Communications Managers Association.

Financially, the deal seems to make sense for both companies.

For EDS, the merger could significantly lower operating expenses. The company runs one of the largest private nets in the world and buys carriage from a number of different carriers for a net that serves 15 large data centers and hundreds of smaller centers.

Once Sprint sets up a few additional switches, the EDS traffic could run on the Sprint network for a marginal cost, according to Daniel Briere, president of TeleChoice, Inc. in Verona, N.J.

Those savings may not be passed on to users, however, because EDS, with its strong outsourcing operation, won't need to cut prices to attract or keep users, Briere explained.

Sprint would reduce its overhead by cutting its operating expenses, according to EDS' Fernandes.

Users want to know what combined services the two firms will be able to offer. "It's one thing to say the merging entities are going to reduce their expenses," said Probe's Bernstein. But "are they going to provide something of greater value than can be provided to the customer by dealing with them individually?"

If the merger goes through, EDS clients can count on a visit from Sprint sales staff. EDS' large corporate U.S customers include Caterpillar, Inc., Continental Airlines Corp., Frigidaire Co., Motorola, Inc., Southland Corp. and Xerox Corp. EDS and Sprint have virtually no customers in common, Esrey noted.

That lack of overlap may be due to difficulty Sprint has had establishing itself with large corporations. "I think it's time Sprint got some legitimacy," TeleChoice's Briere said. "It has largely fixed its billing system, it revamped its network, and it's finally coming out with some decent network management capabilities."

EDS' expertise in project management and application development could help Sprint set up the broadband nets needed for interactive, multimedia services, according to Yankee Group's George Logemann, director of management strategies.

Gonna get married?

	EDS
Business:	Systems integration services
Coverage:	Operations in 30 countries
1993 revenue:	$8.6 billion
Employees:	70,000
	Sprint
Business:	Local and long-distance carrier
Coverage:	Local service in 19 states; cellular service in 42 metro markets; and long-haul service in hundreds of countries
1993 revenue:	More than $11.4 billion
Employees:	50,500

Caller ID

Continued from page 1

their authority, and they peppered the FCC with legal pleas to overturn the decision. Also, carriers warned that they may have trouble making the FCC ruling a reality.

The FCC has the power to regulate interstate telecommunications, while state public utility commissions (PUC) have jurisdiction over intrastate matters. But in filings with the agency, dozens of state PUCs expressed outrage, while the attorneys general of 15 states asked for clarification of the ruling and assurances that state laws will be honored. California has already challenged the FCC decision in court.

Local exchange carriers contend that the FCC's order puts them in the awkward position of having to satisfy different privacy-protection requirements from the states and federal government.

Forty-three states require that per-line blocking be available for intrastate calls, while the new federal rules ban per-line blocking on an interstate level and mandate free per-call blocking.

"It's not technically possible for today's net switches to distinguish between originating interstate and intrastate calls for purposes of applying different privacy blocking protocols," said the U.S. Telecommunications Association.

NYNEX Corp. added, "Technology doesn't exist to provide so-called dual blocking" — a viewpoint echoed by most telecommunications providers.

When US West Communications, Inc. and Cincinnati Bell Telephone asked about making such changes, switch vendors responded that extensive alteration of existing signaling and feature standards would be required — all at an unknown cost.

PROS AND CONS

The ruling did not get any praise from consumer groups, either. The National Association of Consumer Agency Administrators said the order banning interstate per-line blocking "compels an unnecessary invasion for millions of telephone users."

Florida's customs office, whose undercover agents and officers rely on per-line blocking for safety purposes, said that the FCC's new rules posed hazards.

Florida supplied a recent letter from BellSouth Corp.'s security director informing the state that the regional Bell holding company is likely to drop per-line blocking by next April since it was not technically feasible to implement the FCC per-call standard and the Florida standard simultaneously.

But business users remain supportive of the FCC efforts. Domino's Pizza, Inc. stores handle more than 200 million phone calls per year with the help of ANI and caller ID. Domino's computers capture calling party information, bringing up the customer's address so that orders can be taken more quickly.

Employees also check to see if there is a match between the number a caller gives and the caller ID or ANI information the pizza maker receives. The company is reluctant to send a delivery to anyone using call blocking.

"Someone who is going to rob our pizza delivery driver is not going to give us a good phone number," said Don Gonos, telecommunications manager for Domino's nationwide.

The Ad Hoc Telecommunications Users Committee, a group that includes Procter & Gamble Co., American Airlines, Inc. and American Express Co., among others, asked the FCC to extend its caller ID rules so that the calling party name — in addition to the number — would be available nationwide. The registered name of a telephone number can be picked up from databases in the telephone network.

"The FCC should extend its policy to other services," said James Blaszak, attorney for the user committee.

"The caller ID policy has been a very sensible balancing of interests for efficiency and privacy."

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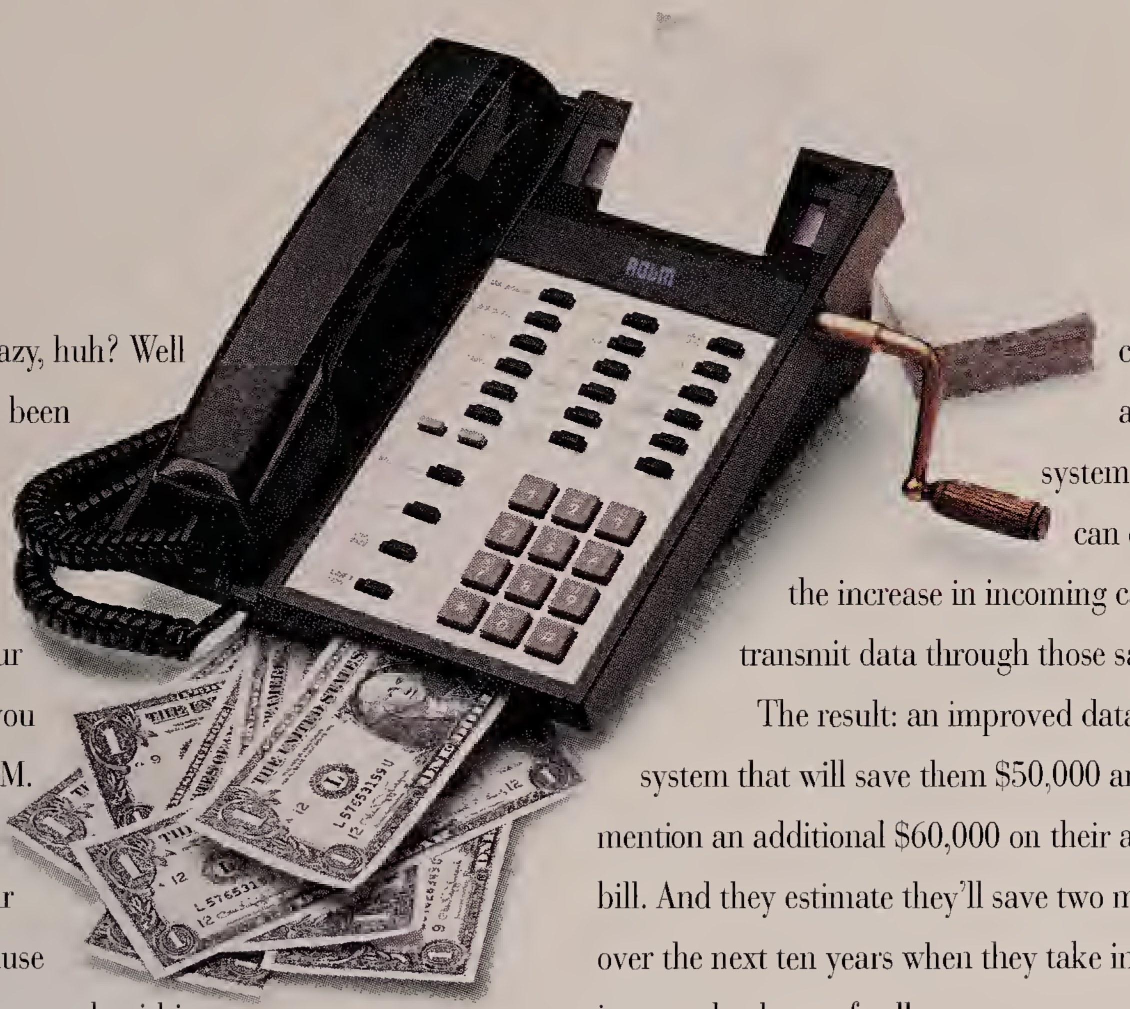

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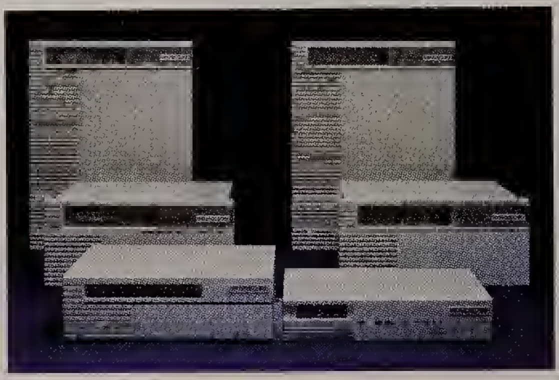

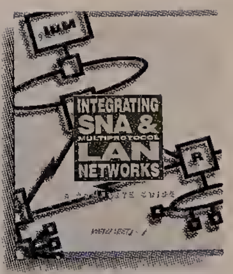

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